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CURRENT HISTORY

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"The easing of the cold war confrontation and the unleashing of the forces of reform in the former Soviet empire led to a welcome increase in the tempo of arms control between 1986 and 1996. A great deal of unfinished business remains, however, and there are indications that the momentum of the last 10 years may be slowing as arms control falls victim to a combination of inattention, questionable policies, and its own success."

Arms Control: The Unfinished Agenda

JACK MENDELSOHN

In January 1986, 10 months after taking office, Soviet General Secretary Mikhail Gorbachev put forward a sweeping proposal for "Nuclear Disarmament by the Year 2000." Gorbachev's plan, although dismissed at the time, signaled his intention to transform the Soviet Union's political and security relationship with the West and ushered in what has been one of the busiest and most successful arms control periods in history.

In the ensuing decade there was considerable progress on traditional arms control concerns and on those issues previously made intractable by cold war mistrust or subordinated to concern about the more than 25,000 nuclear warheads on alert. These critical issues fell into five broad categories: the reduction of nuclear arsenals; the danger of inadvertent nuclear war; the proliferation of weapons of mass destruction; the creation of transparency and confidence-building regimes; and the limitation of conventional weapons.

REDUCING THE NUCLEAR THREAT

The first item on the past decade's arms control agenda has been the effort to reduce the size of the nuclear threat posed by the enormous arsenals of the United States and the Soviet Union / Russia and the growing awareness of the need to deal with the nuclear "overhang" created by thousands

of nondeployed nuclear warheads and tons of excess fissile material (highly enriched uranium and plutonium).

By the end of 1987, one year after Gorbachev discussed the total abolition of nuclear weapons with President Ronald Reagan at the Reykjavik summit, the United States and the Soviet Union had completed the Intermediate-Range Nuclear Forces (INF) treaty banning all intermediate- and short-range land-based nuclear missiles, the first arms control agreement to eliminate an entire class of nuclear weapons and the first in the decade's series of accords that would redefine the East-West security relationship.

In the summer of 1991, the United States and Russia signed the Strategic Arms Reduction Treaty (START I), which cut their long-range nuclear forces from a cold war high of between 11,000 and 12,000 warheads to between 6,000 and 7,000 for each side. In late fall of the same year, amid growing concern for the future stability of the Soviet Union after the abortive Moscow coup by hard-line Communists, United States President George Bush and Gorbachev each made unilateral declarations withdrawing most of their land- and sea-based tactical (short-range) nuclear weapons.

By January 1993, after the Soviet Union had disintegrated and Boris Yeltsin had become president, the United States and Russia had negotiated an additional 50 percent cut in strategic nuclear forces—down to 3,500 warheads for each country—in START II.

JACK MENDELSOHN, the deputy director of the Arms Control Association, served on the United States SALT II and START I delegations.

REMOVING THE NUCLEAR HAIR TRIGGER

A second major item on the arms control agenda has been to "lengthen the fuse" on weapons use in a crisis. During the cold war's peak, nuclear forces were kept at high states of alert in order to respond rapidly to a surprise attack or to preemptively strike in a crisis. As the East-West confrontation eased, the United States and Russia grew more willing to consider mitigating the dangers of hair-trigger alert postures.

In 1988, in an effort to improve both everyday and crisis communications between the United States and Soviet Union, the two countries established nuclear risk reduction centers in Washington and Moscow. The centers house a high-speed direct communications link between the superpowers and are intended to reduce the chance of conflict arising from miscalculation or misunderstanding.

The 1991 START I contained operational arms control provisions that, to aid in verification, specified how and where land-based mobile missile systems could be based and deployed. The United States and the Soviet Union also announced in 1991 that they would take their strategic bombers off 24-hour alert and store nuclear weapons away from the aircraft.

START II sought to lengthen the fuse in a crisis situation by banning all land-based multiwarhead missiles, considered to be the most destabilizing strategic nuclear delivery system because they are attractive targets and are the most likely weapons to be used early in a crisis. In January 1994, the United States and Russia pledged to detarget, or no longer aim at each other, their long-range ballistic missiles.¹ Later that year, Presidents Bill Clinton and Yeltsin agreed that, as soon as START II was ratified, all strategic nuclear delivery systems to be reduced under START II would be deactivated immediately "by removing their nuclear warheads or taking other steps to remove them from combat status."

COMPLETING THE NONPROLIFERATION REGIME

A third item on the arms control agenda has been completing the nonproliferation regime. Because of doubts about Moscow's ability to control its nuclear infrastructure and concern about the development of nuclear, chemical, and biological weapons by Iraq and other "rogue" states (those nations that deliberately fail to observe international norms against the acquisition and use of weapons of mass destruction),

¹While detargeting might be useful in avoiding a catastrophe in the event of an accidental launch (in itself a highly unlikely occurrence), in a crisis missiles can be retargeted in seconds.

the international community has focused intently on stemming the proliferation of such weapons.

The United States and Russia succeeded by 1996 in completely denuclearizing Ukraine, Belarus, and Kazakhstan—the three former republics on whose territory nuclear weapons had been deployed by the Soviet Union—and bringing them into START I and the nuclear Non-Proliferation Treaty (NPT).

Three other countries—Iraq, South Africa, and North Korea—were brought back into the nonproliferation regime between 1991 and 1994 by war, by choice, and by diplomacy, respectively. After Iraq's defeat in the 1991 Persian Gulf War, the UN Special Commission for the Disarmament of Iraq (UNSCOM) was established to monitor the complete dismantlement of Iraqi weapons of mass destruction. In March 1993, South Africa informed the world that it had built six nuclear weapons but had voluntarily dismantled them shortly before joining the NPT on July 10, 1991. Finally, in October 1994, after North Korea had threatened to leave the NPT and pursue its own nuclear weapons program, the United States successfully negotiated an "agreed framework" with North Korea to keep it in the NPT and ultimately to eliminate its existing nuclear facilities.

As part of the continuing effort by the United States and Russia to limit the proliferation risks posed by huge stockpiles of surplus fissile materials, the two countries concluded an agreement in early 1993 to allow the United States to purchase 500 metric tons of Russian highly enriched uranium that will be blended down for use as nuclear reactor fuel. And in November 1994, the United States airlifted 600 kilograms (about 1,300 pounds) of highly enriched uranium from Kazakhstan, enough to make approximately 20 nuclear weapons.

In late 1993, President Clinton proposed a global treaty to end the production of fissile materials. The UN has since mandated talks on a production cutoff agreement, but the negotiations in Geneva are stalled over the scope of the treaty and whether to link it to a formal disarmament schedule.

Multilateral nonproliferation negotiations also made significant headway in the early 1990s. In January 1993, the Chemical Weapons Convention (CWC), which had been under negotiation in Geneva since 1968, was finally completed and signed. The CWC enters into force this April. In addition, the cornerstone of the international nonproliferation regime, the NPT, was unconditionally and indefinitely extended in May 1995.

Further, in late 1996, a Comprehensive Test Ban Treaty was finally completed and signed by the five

declared nuclear powers and some 134 other states. A formal end to nuclear testing had long been considered by the nonnuclear members of the NPT as an indication that the nuclear weapons states were fulfilling their arms control obligations under that treaty.

Last year also saw the completion of the Pelindaba (African) and Southeast Asian nuclear-weapons-free-zone treaties. The United States has signed the Pelindaba treaty protocols and will probably join the Southeast Asian treaty after a dispute over territorial limits is resolved. Together with the 1959 Antarctica Treaty, the 1967 Treaty of Tlatelolco (covering Latin America), and 1986 Treaty of Rarotonga (which covers the South Pacific), the African and Southeast Asian nuclear-free-zone treaties have put a large portion of the Southern Hemisphere off-limits to nuclear weapons.

TRUST, BUT VERIFY

A fourth arms control agenda item has been to increase the transparency of military programs and activities through improved on-site access, verification and confidence-building measures (CBMs), data exchanges, advance notification, and other cooperative measures. Increased transparency has been critical to many of the arms control achievements of the past decade: without confidence in the ability to monitor compliance with arms control limitations, it would have been impossible to conclude some of the most important recent accords.

Traditionally, the Soviet Union equated on-site inspection with espionage and opposed its application to arms control agreements. A political breakthrough in verification came with Gorbachev's nuclear disarmament proposal of January 1986. In it, Gorbachev stated that "verification of the destruction or limitation of arms should be carried out both by national technical means, or NTM (reconnaissance satellites and remote sensors), and through on-site inspections."

The 1987 INF treaty was the first major arms control agreement to be concluded after Gorbachev opened the door to on-site inspection. This treaty included a far more extensive and comprehensive verification regime than any previous arms control agreement, adding intrusive on-site inspections and a complex array of notifications and data exchanges to the already accepted use of NTM.

START's extensive verification regime followed the precedent established by INF. To facilitate monitoring and increase transparency, the treaty calls for regular data exchanges, 12 types of on-site inspections, cooperative measures such as openly displaying strategic systems to NTM, and a commitment not to interfere with the NTM of the other parties.

The years between 1986 and 1996 also saw a steady growth of transparency in Europe with the adoption of a series of measures to expand the basic notifications and confidence-building measures of the 1975 Helsinki Final Act. As a result of these agreements, the members of the Organization for Security and Cooperation in Europe (OSCE) must provide 42 days' advance notice of all major military activities involving more than 9,000 troops and 250 tanks, permit observation of all exercises involving over 13,000 troops, and give two years' prior notification for military activities involving more than 40,000 troops or 900 tanks. Under a voluntary Global Exchange of Military Information (GEMI) program adopted at the December 1994 OSCE summit, member states will provide data on all their armed forces, including technical data, command structures, major weapons holdings, and the strength and location of troops.

Published estimates suggest that over 100 million mines are scattered across 64 nations and that they kill or injure some 26,000 people each year.

LIMITS ON CONVENTIONAL WEAPONS

The fifth major item on the arms control agenda has been the effort to limit conventional weapons. This effort

has been particularly successful in Europe, which, since the end of World War II, has hosted the largest concentration of potentially hostile forces.

In 1989, after having pursued "mutual and balanced force reductions" unsuccessfully for more than 15 years, NATO and the Warsaw Pact agreed to negotiate an agreement to limit conventional armed forces in Europe (the Conventional Forces in Europe treaty, or CFE). Signed in 1990 and fully implemented by 1995, the CFE treaty created a military balance between NATO and the Warsaw Pact by reducing to equal levels each group's military holdings in five categories of conventional weapons (tanks, armored combat vehicles, artillery, helicopters, and aircraft). Accelerated by the collapse of the Soviet empire, CFE reduced a Soviet inventory in 1988 of more than 160,000 pieces of heavy equipment deployed west of the Ural Mountains to slightly more than 25,000 pieces of CFE treaty-limited equipment for Russia by 1996. Another measure of the success of the CFE

treaty is the fact that it was used as a model by the Dayton accords for the regional arms control settlement in the former Yugoslavia.

Two other major initiatives to limit conventional weapons have been developed during the last 10 years. In early 1987, the Missile Technology Control Regime (MTCR) was established to slow the spread of missiles capable of delivering weapons of mass destruction. The MTCR is an informal arrangement consisting of guidelines to constrain the transfer of equipment or technology that would provide, or help a country build, missiles capable of delivering a 500 kilogram (1,100 pound) warhead to a range of 300 kilometers (186 miles) or more. Since 1987, the number of countries that have agreed to adhere to the MTCR guidelines has grown from 7 to 28, including Russia.

The second major conventional weapons initiative is the worldwide effort to control the use of antipersonnel land mines. Published estimates suggest that over 100 million mines are scattered across 64 nations and that they kill or injure some 26,000 people each year. In November 1996, the United States and 84 cosponsors introduced a resolution at the UN to pursue an agreement that would ban the use, stockpiling, production, and transfer of antipersonnel land mines.

START II: DOOMED IN THE DUMA?

The easing of the cold war confrontation and the unleashing of the forces of reform in the former Soviet empire led to a welcome increase in the tempo of arms control between 1986 and 1996. A great deal of unfinished business remains, however, and there are indications that the momentum of the last 10 years may be slowing as arms control falls victim to a combination of inattention, questionable policies, and its own success.

The unfinished business includes the critical issue of assuring the continued reduction of nuclear weapons. The Russian Duma has yet to ratify START II because it objects to the expensive restructuring of Russian strategic forces that will be required to comply with the terms of the agreement (the United States Senate ratified the treaty in January 1996). In addition, many Duma members want to delay action on the treaty in order to have time to evaluate the impact of NATO expansion and United States missile defense programs on Russian security interests. Even if START II does enter into force, the permitted level of 3,500 warheads is clearly excessive. Force levels should be brought down by at least another 50 percent—and could go even lower—to

better reflect the limited utility and unlikely need for nuclear weapons.

Arms control must also address the problem of securing nondeployed warheads and excess fissile material. The United States and Russia have pledged to dismantle many of the tactical weapons withdrawn unilaterally in 1991 and 1992. To help absorb some of the enormous surplus of weapons-grade fissile material, the United States should seek to expand its current program to purchase highly enriched uranium from dismantled Russian warheads.

At present, no treaty calls for the actual destruction of warheads taken out of service. One possible approach to paring back the nuclear overhang of the post-cold war period might be to require the verifiable dismantlement of a specific number of warheads on each side, perhaps equivalent to that reduced under START II, and the monitored storage of the fissile material from the weapons.

As the overall political relationship improves, operational arms control should continue the process of taking strategic nuclear forces off hair-trigger alert. Ideally, warheads should be removed from a large portion—or all—of the land-based missile force. Strategic bombers should remain off alert and their weapons stored well away from their operational bases. In the strategic submarine force, steps should be taken to ensure that launch systems cannot be activated without the crew receiving codes from shore. In addition, missile submarines should patrol on modified alert and, when feasible, out of range of potential targets. Aggressive antisubmarine warfare training activities should be limited to engagement with vessels of the same nation.

STANCHING PROLIFERATION

The nonproliferation regime should be completed. The first order of business is for the United States and Russia, the nations with the largest declared stockpiles, to join the 70 countries that have already ratified the Chemical Weapons Convention.

Because of the manner in which it was drafted, the 1996 Comprehensive Test Ban Treaty cannot enter into force until India, which has refused even to sign the accord, ratifies it. Clearly, the international community will have to mount a major effort to bring India, which is concerned about the nuclear capabilities of China and Pakistan, on board. Success in this endeavor will depend partly on domestic political developments in New Delhi and partly on the evolution of the security environment in the region. Alternatively, the CTBT could be provisionally waived into force. In any case, it will be important

to ensure that the nuclear powers do not resume testing while this issue is being resolved.

The 1972 Biological Weapons Convention (BWC), another component of the nonproliferation regime, is in the midst of efforts to negotiate verification and enforcement provisions. A special ad hoc committee charged with drafting a verification protocol for the BWC was unable to do so before the convention's November 1996 review conference. This protocol needs to be adopted to reinforce the international norm against the production, stockpiling, and use of these weapons and to complete the trio of agreements that constitute the heart of the weapons of mass destruction nonproliferation regime.

The NPT will also require some attention over the next decade. The international community will have to continue steadfastly the process of reintegrating Iraq and North Korea into the nonproliferation regime and discouraging rogue states from seeking a nuclear weapons capability. At the same time, every effort should be made to bring the non-declared nuclear states—India, Israel, and Pakistan—into the NPT, but, as with India and the CTBT, this will depend on regional security developments.

In the next 10 years there are a number of additional steps that could be taken to increase transparency. If a warhead elimination scheme is adopted, the United States and Russia will have to negotiate reasonable provisions for transparency to track the input of warheads and output of fissile material at the warhead dismantlement facilities, and a similar input / output verification regime at warhead production facilities. This regime would require the exchange of highly sensitive national security information, however, and, given the continuing uncertainties in the United States–Russian relationship, may be difficult and time-consuming to conclude.

The Open Skies Treaty, which permits unarmed aircraft equipped with various sensors to conduct observation flights over member states, is likely to come into force in this decade, although three key states—Russia, Belarus, and Ukraine—have yet to ratify it. In addition, military-to-military contacts and laboratory exchanges should be expanded. In terms of building confidence and understanding, these have been among the most successful exchanges undertaken since the end of the cold war. Finally, the voluntary arms registries, developed by the UN and OSCE, should be expanded in both scope and membership, and reporting made an international obligation.

In the area of conventional weapons, the United States, Europe, and Russia will have to work together to adapt the CFE treaty to the post–cold war period. Negotiations to this end have recently begun in Vienna. These will probably lead to moving from group to national limits, since there is now only one alliance; lowering the levels of equipment, since most of the allotments have not been filled; and allowing Russia some additional flexibility in deployments, since it and Ukraine are the only nations with limits on the geographic distribution of forces on their own territory.

The next decade will also see an intensification of the effort to ban antipersonnel land mines. Negotiations will be conducted at the Conference on Disarmament in Geneva, but are likely to be prolonged because of resistance from some nations that believe land mines still play a “useful and legitimate” security role. Finally, a more concerted and committed effort by all the major arms-producing nations is needed to control the sale and transfer of conventional weapons, especially to regions of potential instability or conflict.

*After one of its
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THE DANGERS REMAINING

Because there has been such substantial progress in arms control over the last decade, and because no credible threat to United States security has replaced the Soviet empire, the public and some members of the political and analytic communities have come to

believe that progress in arms control has become less urgent and less relevant. This is a dangerous misperception.

First, a great deal remains undone on the arms control agenda. Major developments in United States–Russian bilateral arms reductions stopped over four years ago with START II, and that treaty has not yet come into force. With the notable exception of the NPT, which was indefinitely extended in 1995, major multilateral nonproliferation agreements are either unfinished (the BWC verification protocol), unstarted (the fissile material cutoff), unlikely to come into force for some time (the CTB), or yet to be ratified by Russia or the United States (the CWC). And while there has been notable success in denuclearizing Ukraine, Belarus, Kazakhstan, and South Africa, and in keeping North Korea from leaving the NPT, India, Israel and Pakistan—the three non-declared nuclear states—are no closer to joining the NPT.

Second, political developments have been unfavorable for arms control in the United States and Russia. In the United States, President Bill Clinton's political options were limited in 1994 with the election of a Republican Congress and its "Contract with America," which called for the expansion of NATO and deployment of missile defenses. Although Clinton was reelected in 1996, the Republicans continued to control Congress and, within a month of convening, had brought up two bills on missile defense deployment and seemed to be in no hurry to take up CWC ratification.

In Russia, a political shift began in 1993 when Yeltsin's political authority and later his physical strength began to wane. The attack on the parliament building in late 1993, the invasion of Chechnya in December 1994, the disastrous parliamentary elections of 1995, the chaotic presidential elections of 1996, and Yeltsin's continuing health crisis all took their toll. Conservative and nationalist members dominate the Duma and have criticized the Yeltsin administration for its domestic and foreign (that is, pro-Western) policies. As a result of these sharp executive and legislative splits, both Clinton and Yeltsin have been preoccupied with their domestic political challenges and unable or unwilling to push the arms control agenda.

Finally, recent policy decisions in the West have made it difficult to bring closure to some arms control issues. The Western decision to expand NATO is anathema to Moscow and risks driving Russia into a truculent, not-so-splendid isolation and forcing it to rely on nuclear weapons as its primary security guarantee. Moreover, Moscow's reaction to NATO expansion may be so sharply negative that the opportunity for progress in arms control could be lost for some time. This would be a major setback, since Russia is a key player, not only in nuclear arms control arrangements with the United States, but also in the European treaty on conventional forces and worldwide agreements to ban chemical weapons and nuclear testing. All these could be jeopardized, or greatly delayed in their implementation, if Russia leaves the arms control table because it feels it has been denied a proper place at the European security table.

Missile defenses are another potential threat to arms control. Because missile defenses undercut confidence in the deterrent ability of strategic offensive nuclear forces, steep strategic force reductions and large-scale national missile defenses are incompatible. Highly capable theater missile defenses,

although not explicitly restricted by the 1972 Anti-Ballistic Missile Treaty, would have the same effect. It is therefore essential, if United States-Russian nuclear force reductions are to continue, to preserve existing limits on national missile defenses and devise a mutually acceptable plan for deploying the advanced theater missile defense systems currently under development. If the missile defense issue causes the United States and Russia to slow down or abandon the process of nuclear force reductions, this could impact on the entire nonproliferation regime.

Two other systemic problems threaten arms control in the next decade. One is the question of continued funding to aid in the dismantlement and destruction of nuclear and chemical weapons in the former Soviet Union. To date, nearly \$2 billion has been appropriated for the 1991 Nunn-Lugar Cooperative Threat Reduction program. Even though it is manifestly in the United States interest to help eliminate these weapons of mass destruction, a deterioration in relations with Moscow would lead to attacks on the Nunn-Lugar effort (because it frees Russian resources for military modernization) and its curtailment.

A second systemic problem is the threat of rogue states. Iraq is a case in point, with its use of chemical weapons in its war with Iran in violation of the 1925 Geneva Protocol, and its pursuit of nuclear weapons in violation of commitments under the NPT. Rogue states are likely to continue to challenge the international community, but they cannot be allowed to justify the abandonment of the nonproliferation regime. The best response to the threat of rogue states is to establish, maintain, and strengthen the nonproliferation regime so that the international community can deter, detect, and respond legally and collectively to violations of the global norm.

ADVANCE THE AGENDA

After one of its most successful decades, the opportunities and challenges for arms control are by no means behind us. The agenda has changed from dealing with large-scale and highly visible threats of great public interest to a less glamorous effort to make the world more "transparent," ensure that regional confrontations are more stable, and make the future safe from inadvertent war or rogue states. This new agenda challenges political leaders to keep the arms control process moving, incrementally but inevitably, toward a more secure twenty-first century. ■

"The history of weapons decisions suggests that nuclear proliferation (and conversely, nuclear restraint) has occurred in the past, and can occur in the future, for more than one reason. . . [T]his means that no single policy is likely to be sufficient to ameliorate all future proliferation problems, and that actions that help address one proliferation danger might well exacerbate another."

The Causes of Nuclear Proliferation

SCOTT D. SAGAN

Why do states build nuclear weapons? Many policymakers and scholars believe that there is a simple answer: states seek to develop nuclear weapons if they face security threats that cannot be met by alternative means; if they do not face such threats, they will willingly remain nonnuclear states. This belief—the "security model" of proliferation—is dangerously misleading, for nuclear weapons programs also serve objectives other than national security; they are key issues in domestic politics and bureaucratic struggles and important symbols of modernity and national identity. When United States policy focuses exclusively on the security model, it ignores nonproliferation tools and strategies that can address these other sources of the demand for nuclear weapons.

CURRENT AND FUTURE PROBLEMS

The diagram on page 152 presents an estimate of the current constellation of states in the international system with respect to the supply of technology and nuclear materials that produce latent nuclear weapons capabilities, and the seriousness of each state's efforts to acquire or maintain nuclear weapons arsenals. This simple diagram underscores three important points.

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¹This is true despite the 1995 agreement to extend permanently the nuclear Non-Proliferation Treaty; every five years there will be NPT review conferences assessing the implementation of the treaty, and each member state can legally withdraw from the treaty under the "supreme national interest" clause after giving three months' notice.

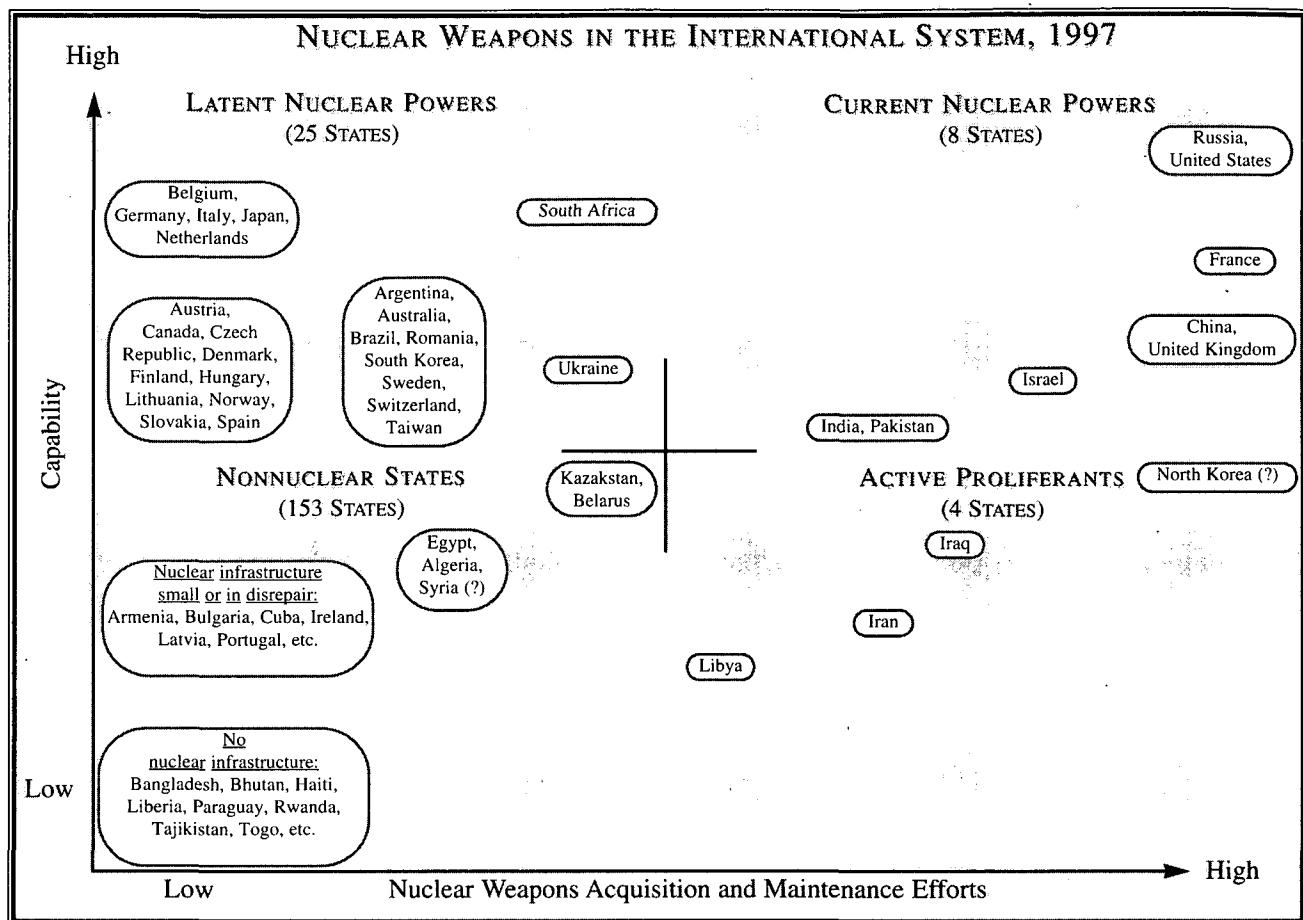
²See Scott D. Sagan and Kenneth N. Waltz, *The Spread of Nuclear Weapons: A Debate* (New York: W. W. Norton, 1995).

First, more than 50 years after nuclear weapons were invented, the vast majority of states remain in the lower-left "nonnuclear" quadrant; they have little access to nuclear technology and have made little apparent effort to acquire weapons. Second, the widespread diffusion of scientific knowledge about the bomb and common nuclear reactor technology has produced a trend whereby ever-increasing numbers of states develop a latent nuclear weapons capability and move into the top-left quadrant. Third, the figure suggests that while most attention concerning proliferation in the immediate term has appropriately focused on nuclear-smuggling problems and the small number of active proliferators that appear to have covert nuclear weapons programs, the largest long-term potential proliferation problem is the growing number of latent nuclear weapons states. The fact that there are so many nonproliferation success stories—states that have reversed their nuclear weapons status (South Africa, Kazakhstan, Ukraine, and Belarus), abandoned active weapons programs (such as Sweden, Switzerland, South Korea, and Taiwan), or never developed a full-fledged weapons program (such as Germany and Japan)—should not lead us to forget how this proliferation map could change if stronger demands for nuclear weapons emerge in the future.

These observations suggest that constraints on the demand side, rather than constraints on supply, will be increasingly critical in future nonproliferation efforts.¹ To reduce future demands for nuclear weapons, however, one must first understand the causes of proliferation.

PROLIFERATION AS A STRATEGIC CHAIN REACTION

According to neorealist theory, a state can balance against a nuclear rival in one of two ways.² First, a state can form an alliance with another



nuclear power by relying on extended deterrence commitments. This is usually the cheapest option available, but the policy raises questions about credibility, since the nuclear power would fear retaliation if it responded to an attack on its ally. The second option is for a state to pursue a form of internal balancing by developing its own nuclear weapons as an ultimate guarantee of state survival.

According to this realist security model, the basic history of proliferation can be easily outlined as a strategic chain reaction. During World War II, none of the major belligerents was certain that the development of nuclear weapons was possible, but all knew that other states could soon be working on a bomb. The United States developed atomic weapons first, not because it had any greater demand for the bomb, but because it had invested more heavily in the program and made the right technological and organizational choices. After August 1945, the Soviet Union's program was reinvigorated because Hiroshima and Nagasaki served as demonstrations that nuclear weapons were technically possible and the emerging cold war meant that a Soviet bomb was a strategic imperative.

Once the Soviet Union developed nuclear weapons, Britain and France sought their own capa-

bility to counter the threat because of the resulting reduction in the credibility of the United States nuclear guarantee to NATO. China developed the bomb because the United States threatened to use nuclear weapons at the end of the Korean War and during the Taiwan Strait crises in the 1950s, and because of the emergence of Sino-Soviet tensions in the 1960s. After China developed the bomb in 1964, India, which had fought a war with China in 1962, responded with its "peaceful nuclear explosion" of May 1974. After the Indian detonation, it was inevitable that leaders in Islamabad would decide that Pakistan, too, needed a nuclear deterrent.

Looking toward the future, the security model leads one to fear that new states will respond to emerging or potential regional threats by developing their own nuclear deterrent. Two central policy prescriptions are thereby produced. First, since alliance guarantees with a nuclear power are the main alternative method for gaining some degree of nuclear security, a key nonproliferation tool is maintaining United States extended deterrence commitments to allies in Europe and Asia, including some form of continued United States nuclear first-use policy. In Asia, this highlights the need for a strong United States military commitment to Japan and

South Korea; in Europe, it suggests that it is important to continue stationing nuclear weapons in Germany and to maintain NATO's traditional "flexible response" military doctrine, under which nuclear weapons may be used if conventional defense fails.

Second, the Nuclear Non-Proliferation Treaty (NPT) is needed to permit nonnuclear states to overcome a collective action problem: latent nuclear states might refrain from proliferation if the treaty provides increased confidence that their neighbors will follow suit. It follows, therefore, that other elements of the NPT regime are far less important; specifically, the commitments that the United States has made under Article VI of the treaty—that the nuclear powers will pursue "negotiations in good faith on measures relating to cessation of the nuclear arms race at an early date and to nuclear disarmament"—are seen as mere sops to public opinion in nonnuclear countries. The degree to which the nuclear states follow through on Article VI commitments will not significantly influence the actual behavior of nonnuclear states, since it will not change their basic security calculation.

DOMESTIC SOURCES OF PROLIFERATION

A second approach to understanding proliferation focuses on the domestic actors who encourage or discourage governments from pursuing the bomb. Whether or not the acquisition of nuclear weapons serves the national security interests of a state, it can serve the parochial interests of such actors as the nuclear energy establishment (officials in state-run laboratories as well as private reactor facilities); important units within the professional military (often within the air force, though sometimes in navy bureaucracies interested in nuclear propulsion); and politicians in states in which individual parties or the mass public strongly favor nuclear weapons acquisition. When such actors form coalitions that are strong enough to control the government's decision-making process—either through their direct political power or indirectly through their control of information—nuclear weapons programs are likely to thrive.

From this perspective, nuclear weapons programs are solutions looking for a problem to justify their existence. Potential threats to a state's security may certainly exist, but these threats are seen as malleable and subject to interpretation, and can produce different responses. External security threats are therefore not the central cause of weapons decisions: they are merely windows of opportunity for parochial interests.

The historical case of proliferation that most strongly fits the domestic politics model is the Indian government's 1974 decision to test a peaceful nuclear explosive and subsequently to develop a significant larger nuclear weapons capability. Contrary to the neorealist account outlined earlier, there was no consensus among officials in New Delhi that it was necessary to have a nuclear deterrent after the 1964 Chinese nuclear test. If that had been the case, one of two events would have occurred. First, given the relatively advanced state of Indian nuclear energy research at the time, an Indian nuclear weapon would have been tested in the mid- to late 1960s. Second, leaders in New Delhi would have made a concerted effort to acquire nuclear guarantees from the United States or other nuclear powers; instead, Indian officials only reluctantly entered into discussions of security assurances, refused to consider foreign bases in India to support a nuclear commitment, and publicly questioned whether any guarantee could be credible.

Instead of a united Indian effort to acquire a deterrent, the Chinese test produced a prolonged bureaucratic battle inside the political elite and nuclear energy establishment. After the Chinese test, for example, Prime Minister Lal Bhadur Shastri argued against developing an Indian arsenal, in part because the estimated costs (between \$42 million and \$84 million) were deemed excessive; Homi Bhabha, the head of the Atomic Energy Commission, however, lobbied for the development of nuclear weapons capability, claiming that India could manufacture 50 atomic bombs for less than \$21 million. A compromise policy was the result of this deep disagreement: pro-bomb nuclear scientists could conduct research and make technical preparations for future contingencies, but they could not develop complete nuclear weapons to be tested.

Although firm evidence on why Prime Minister Indira Gandhi reversed this policy and gave approval for the nuclear test in 1974 is not available, a number of points suggest that addressing changing domestic political concerns—rather than countering international security threats—was her primary motivation. Senior defense and foreign affairs officials were not extensively involved in the decision to prepare the nuclear device, nor in the final decision to test it. At a minimum, this suggests that security arguments were not thoroughly analyzed before the test. Moreover, the subsequent absence of a systematic program for nuclear weapons or peaceful nuclear explosions development and testing suggests that the decision was

made quickly and focused more on immediate political concerns (such as shoring up the government's sagging domestic support) than on longer-term security or energy interests. Indeed, public support for the Gandhi government had fallen to an all-time low during the months preceding the nuclear weapons test because of a severe domestic recession and the disruption caused by India's first nationwide railway strike. Gandhi used the test to defuse an issue about which she had been criticized by her more hawkish domestic opponents.

The ambiguity of Indian nuclear weapons policy since the 1974 test appears less like the product of a strategy of nuclear ambiguity and more like a post-hoc doctrine used to justify capabilities developed for other reasons. From this perspective, the subsequent building of greater nuclear weapons capabilities is not a proud symbol of the success of an Indian national security program. Instead, it is a symbol of the failure of the Indian civilian nuclear power industry, which has been forced to form an alliance with the pro-bomb lobby to justify its existence and funding after its failure to avoid cost overruns and prevent safety problems in domestic energy programs.

A focus on domestic politics also provides a different prediction about the future. If India starts to test new nuclear weapons and deploys them in the field, it will not be the result of new Chinese or Pakistani military threats to Indian security—it will be the result of the domestic weakness of a coalition government in New Delhi that could flout the international nonproliferation regime and test weapons to increase its standing in public opinion polls and to defend itself against common criticisms emanating from the opposition Hindu nationalist parties.

A NEW SET OF NONPROLIFERATION TOOLS

A domestic politics approach suggests that the United States needs to develop a broader set of nonproliferation tools. For example, United States and international financial institutions are increasingly demanding cuts in military expenditures as part of conditionality packages for aid recipients; future efforts to develop more conditionality linkages to nuclear programs—such as deducting the estimated budget of any suspect research and development program from loans to a country—could heighten domestic opposition to nuclear programs. Providing technical information and intellectual ammunition to domestic actors by encouraging more accurate estimates of the economic and environ-

mental costs of nuclear weapons programs and highlighting the risks of nuclear accidents could bring new members into antiproliferation coalitions. In addition, efforts to encourage strict civilian control of the military through educational and organizational reforms could be productive, especially in states in which the military has the capability to create secret nuclear programs (as in Brazil in the 1980s) to serve their parochial interests.

To the degree that professional military organizations are instrumental, encouraging their involvement in other military activities (such as Pakistani participation in peacekeeping operations or the Argentine navy's role in the Persian Gulf) could decrease their support for nuclear weapons programs; to the degree that the key actors are laboratory officials and scientists, assistance in nonnuclear weapons research and development programs (as in the current Russian-American lab-to-lab programs) could decrease personal and organizational incentives for nuclear weapons research.

Finally, the nuclear powers' commitment under Article VI of the NPT to work for disarmament is important because of the impact that it can have on domestic discussions in nonnuclear states. In future debates in potential proliferants, the arguments of antinuclear actors—that nuclear weapons programs do not serve the interests of their states—can be more easily countered by pro-bomb actors whenever they can point to specific actions of the nuclear powers, such as refusing to negotiate "deep cuts" in arms control agreements or continuing to maintain nuclear first-use doctrines, that highlight their reliance on nuclear deterrence.

NUCLEAR WEAPONS AND THE THOROUGHLY MODERN STATE

A third explanation of nuclear proliferation focuses on international norms on weapons acquisition. According to this perspective, state behavior is determined not by leaders' cold calculations about national security or parochial domestic interests but, rather, by deeper norms and shared beliefs about what international actions are legitimate and modern. Military arsenals can be envisioned as serving symbolic functions similar to flags, airlines, and Olympic teams. They are part of an international norm concerning what it means to be a modern and legitimate state.

The symbolic meaning of an international action is often contested at first, and the resulting norms may be spread by power and coercion, not by the strength of ideas alone. Still, once created, such

international norms can take on a life of their own. For example, existing norms in the NPT against nuclear weapons acquisition were in large part created by the most powerful states in the international system to serve their narrow political interests. Yet, once that effort was successful, these norms shaped states' identities and expectations; even powerful actors have become constrained by the norms they have created.

The history of nuclear proliferation is particularly interesting in this regard because there appears to be a major discontinuity emerging as a result of the NPT. The NPT appears to have shifted the norm concerning what acts grant prestige and represent modernity from the 1960s notion of joining "the nuclear club" to the 1990s concept of joining "the club of the nations adhering to the NPT." These arguments are best supported by contrasting two cases: France in the 1950s and Ukraine in the 1990s.

The French decision to build nuclear weapons is best explained if one focuses on French leaders' perceptions of the bomb's symbolic significance. France emerged from World War II a liberated victor whose military capabilities and international standing were not at all comparable to its prewar power and status. The governments of the Fourth and Fifth Republics vigorously explored how to return France to its historical great power status. The initial French effort focused on its overseas empire, yet that source of *grandeur* diminished greatly in the anti-colonial fervor of the 1950s.

After 1958, the Algerian crisis contributed to President Charles de Gaulle's obsession with nuclear weapons as the remaining symbol of French greatness. Indeed, de Gaulle was not terribly concerned about whether French nuclear forces could provide adequate deterrence against the Soviet military threat: during both the 1958 Berlin crisis and the 1962 Cuban crisis, for example, he expressed great confidence that the Soviet Union would not risk an attack on NATO Europe. Instead, the atomic bomb was a dramatic symbol of independence; it was needed for France to continue to be seen, by itself and others, as a great power.

When the French nuclear weapons arsenal is viewed in this way, a number of otherwise puzzling aspects of the history of French atomic policy become more understandable. For example, the repeated Gaullist declarations that French nuclear

weapons should have worldwide capabilities and must be aimed in all directions ("tous azimuts") are seen not as the product of security threats that came from everywhere, but rather the result of a policy logically consistent with global *grandeur* and independence. Similarly, the profound French reluctance to stop nuclear testing in the mid-1990s is seen as being produced, less by concerns for weapons modernization or warhead safety, and more because weapons tests were perceived by the Paris government as potent symbols of French identity and status.

Contrast the French proliferation decisions of the 1950s and the Ukrainian decision to give up its weapons in 1994. Ukraine's decision is puzzling for neorealists since the history of Russian expansionist behavior and continuing tensions over the Crimea should have led Kiev to hold onto its inherited nuclear arsenal. The disarmament decision is also puzzling from a domestic politics perspective since

public opinion polls in Ukraine showed rapidly growing support for keeping nuclear weapons in 1992 and 1993. Prime Minister (later President) Leonid Kuchma and other senior political leaders came from the missile-building industry and would not have been expected to take an antinuclear position.

Ukraine's decision is more easily understood when one focuses on the role played by NPT norms. Although Ukrainian officials continued to be

interested in enhancing the state's international prestige, the NPT regime created a history in which the most recent examples of new or potential nuclear powers were so-called rogue states such as North Korea, Iran, and Iraq. This was hardly a nuclear club whose new members would receive international prestige. At the same time, the ability to present strong international pressures for disarmament were critically influenced by the existence of the NPT norm; without the norm, threats to eliminate economic aid and suspend political ties would be less credible, since individual states would be more likely to defect from an agreement. Last, the Kiev government and the Ukrainian public could more easily accept the economic inducements for weapons destruction, offered by the United States and others, under the belief that such funds were enabling Ukraine to keep an international commitment, rather than being seen as the crass purchase of Ukrainian weapons by foreign governments.

To the degree that these norms remain influential, it will be important for the United States and other nuclear powers to adjust their nuclear weapons doctrines and arms control policies. This will be difficult, because some of the policy changes that would support the emerging norms against nuclear weapons contradict policy recommendations derived from other models. For example, focusing on NPT norms raises concerns about how existing United States nuclear first-use doctrine influences potential proliferators' perceptions of the legitimacy of nuclear weapons possession and use. To the degree that first-use policies create beliefs that nuclear threats are what strong powers issue, they will become desired symbols for states that aspire to that status. Similarly, the norms perspective suggests that current United States declaratory statements threatening the use of nuclear weapons to deter biological or chemical weapons use would have a negative impact on the nonproliferation regime. How can the United States convince other states that they should not build nuclear weapons to deter neighbors with chemical or biological weapons if the greatest conventional power in the world still thinks that it needs nuclear weapons for that purpose?

Other policy initiatives are less problematic. In specific cases when norms concerning prestige are important for states, the United States could support a future initiative to make UN Security Council membership for Japan, Germany, and India conditional on their permanent nonnuclear status under

the NPT. This perspective also suggests that it is important for the United States to reaffirm its NPT commitments to complete disarmament, since backsliding from Article VI could encourage nonnuclear states to envision nuclear weapons as granting legitimacy and prestige for a long time into the future.

POLICY CONUNDRUMS

The history of weapons decisions suggests that nuclear proliferation (and conversely, nuclear restraint) has occurred in the past, and can occur in the future, for more than one reason; different historical cases are best explained by different causal models. If this argument is correct, it poses difficult challenges for international nonproliferation policy; no single policy is likely to be sufficient to ameliorate all future proliferation problems, and actions that help address one proliferation danger might well exacerbate another. Most important, a security-oriented strategy of maintaining a major role for United States nuclear guarantees to restrain proliferation among its allies will eventually create strong tensions with a norms-oriented strategy seeking to delegitimize nuclear weapons use and acquisition. United States decision makers will eventually have to choose between the difficult nonproliferation task of weaning allies away from nuclear guarantees without producing new nuclear states, and the equally difficult task of maintaining a norm against nuclear proliferation without the United States facing its logical final consequence. ■

"National missile defense remains an unworkable solution to a problem that does not exist. And every moment devoted to the missile defense debate is a moment stolen from addressing real solutions to real problems facing America and the world today."

The Ballistic Missile Defense Debate

JOHN PIKE

Although the cold war has ended, the controversy over missile defense has not. Indeed, missile defense has emerged as one of the defining differences between congressional Republicans and a Democratic administration, even as prevailing thinking among Democrats has gradually shifted toward embracing missile defenses.

Changing geopolitical conditions and shifts in the political winds have not, however, altered the fundamentals of the missile defense debate: Are there threats that require missile defense? Will such defenses be effective? And will they be worth the cost? For the most part, those who were enthusiastic about missile defense during the cold war have retained their enthusiasm, while those who were skeptical have found a growing body of evidence to reinforce their skepticism.

STAR WARS REDUX?

In 1993 the Clinton administration declared that the debate over "Star Wars"—the media's label for the Reagan administration's Strategic Defense Initiative (SDI)—was over. The administration recast the initiative as the Ballistic Missile Defense Program. However, this new name resulted in few changes in actual programs or technology.

Today the United States is pursuing a broadly based research and development program that encompasses a wide range of antimissile interceptors and sensor systems. These programs are intended to counter all potential threats, from conventional tactical missiles with ranges of a few hundred miles to nuclear-tipped missiles with ranges of thousands of miles. This diversity of programs has produced a diversity of controversies, with the greatest attention increasingly centered on the need

for a strategic national missile defense (NMD) against nuclear intercontinental ballistic missiles (ICBMs) capable of directly attacking the United States. Most of the NMD schemes under consideration consist of long-range ground-based interceptor rockets at one or more locations in the continental United States. If a hostile missile launch were detected by satellite sensors, these interceptors would be launched in the general direction of the incoming missile. Other satellite sensors and ground-based radars would refine the location and trajectory of the incoming nuclear warheads and relay this information to the antimissile interceptor. As the interceptor neared its target, an onboard telescope would lock onto it, enabling the interceptor to home in and destroy the nuclear warhead in a direct, high-speed collision.

The Clinton administration's NMD program is referred to as "3+3"—a three-year development and planning phase running from 1996 through 1999 that, if necessary, could be followed by an additional three-year deployment phase. This system, consisting of 100 interceptors deployed at a single launch site, is intended to counter an ICBM attack of several missiles launched at the United States from one of the so-called rogue states, such as North Korea, or a small, accidental launch from more nuclear-capable states, such as China. If by 1999 it was judged that the ballistic missile threat to the United States warranted the deployment of an NMD system, that system could be deployed three years later, by the year 2003. However, if by 1999 the threat were judged insufficient to warrant deployment, the 3+3 program would preserve the option to deploy an NMD system within three years of a decision to do so by allowing continued development and testing of system elements.

In late 1995, the Air Force and Army proposed alternative plans, based on an immediate commitment to deployment, that would require a mini-

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mum of approximately four years to achieve an operational capability. These plans, which call for only 20 interceptor missiles at a single launch site, use ground-based radars, sensors, and battle management elements similar to those in the 3+3 plan. The primary difference between these plans and the 3+3 program is that the military proposals envision an immediate commitment to deploy a rudimentary missile defense with only a few interceptors, while providing less of a basis for subsequent deployment of larger systems.

Deeming the military and 3+3 efforts inadequate, congressional Republicans have introduced legislation requiring the deployment by 2003 of a system to provide "a highly effective defense of all 50 states against limited, unauthorized and accidental attacks...[that would be] augmented over time to provide a layered defense against larger and more sophisticated ballistic missile threats as they emerge." Just what this would entail remains unclear, although the initial defense would include larger numbers of the same components as the administration's plan. Rather than 100 interceptors at a single site, many Republicans would prefer the deployment of hundreds of interceptors at as many as half a dozen separate launch sites. And under congressional plans, more layered defense would soon follow, with the addition of Reagan-era space-based weapons such as lasers or kinetic energy interceptors.

The primary differences between Congress and the White House relate to the timing of the deployment decision—Congress favors an immediate decision to proceed, while the White House favors delaying this decision for a few years. But the Clinton 3+3 plan would achieve an operational system at the same time as the congressional plan, though with a slightly more leisurely decision-making time line; moreover, the Reagan-era follow-on programs such as space-based lasers that were embraced by Congress have also been funded by the Clinton administration.

DO WE NEED IT?

During the cold war, there was little doubt that the Soviet Union and the United States had nuclear missiles aimed at and capable of reaching each other. Some argued that this mutual hostage relationship gave both countries an interest in avoiding war. But advocates of antimissile systems were never reconciled to this state of affairs and con-

tended that deterrence was a strategy that could be changed, rather than a condition that had to be accepted.

For cold war advocates of strategic defense, ballistic missile defense remained the missing ingredient in the more comprehensive nuclear war-fighting strategies that informed other strategic nuclear programs. Without ballistic missile defense, other offensive weapons could inflict mortal damage on the Soviet Union, but could not deny the Soviet Union the ability to inflict equally mortal damage in return.

Thus in the early years of the cold war the United States and the Soviet Union expended billions of dollars on attempting to perfect antimissile systems to shield against the nuclear threat. But by 1972 it had become increasingly apparent that antimissile systems not only held no prospect for reducing nuclear dangers, but, perversely, contributed to the nuclear danger.

*The costs of
missile defense
are not only
economic;
there are also
real security
costs.*

Why? The effects of a nuclear attack are relatively straightforward and easy to calculate. Calculating the potential effectiveness of a complex antimissile system is fraught with profound uncertainties: will radars and computers work as designed, and will interceptors find their way to incoming nuclear warheads? Initial experimental testing did not produce encouraging answers to these vexing questions. It seemed inevitable that the cautious defender would tend to underestimate the system's effectiveness and err on the side of caution by adding more interceptors and radars to thicken the shield against unexpected misfortune. And, inevitably, the conservative attack planner would tend to overestimate the system's defense effectiveness and add more offensive weapons to be sure of penetrating the defense.

Guarding against such a potentially open-ended arms race was the central consideration in the signing of the Anti-Ballistic Missile (ABM) treaty by the United States and the Soviet Union in 1972. This treaty was the sturdy companion of the first Strategic Arms Limitation Treaty—SALT I, also signed in 1972—and has remained a companion to subsequent strategic arms limitation and reduction agreements. Only by constraining antimissile systems was it deemed possible to limit and reduce offensive missiles; the negotiated elimination of missiles in peacetime seemed a far more reliable cap on the nuclear danger than trying to shoot them down in wartime.

ROGUE THREATS

However, the proponents of antimissile systems have gained a new lease on life with the prospect of nuclear wars that are indeed limited, if only by virtue of the modest stockpiles of missiles and nuclear weapons that might in the future be held by potential adversaries, the so-called rogue states of Iran, Iraq, Libya, North Korea, and Syria. Yet apart from a few off-hand comments to reporters, there is no concrete evidence that any of these countries is actively attempting to build or acquire ballistic missiles capable of reaching the continental United States. The Iraqi program has been dismantled, and Libyan efforts are long in abeyance. At present the only country of immediate concern to the United States is North Korea.

In late 1995 the United States intelligence community concluded that "no country, other than the major declared nuclear powers, will develop or otherwise acquire a ballistic missile in the next 15 years that could threaten the contiguous 48 states and Canada." However, North Korean intentions concerning the development of longer-range ballistic missiles remain uncertain. Intelligence is ambiguous as to whether the newest North Korean missiles represent a serious effort or merely an attempt to deceive the American intelligence community—it may be that the mock-ups and test facilities observed by American intelligence satellites are in fact crafty deception measures. North Korean capabilities to develop intermediate-range missiles appear meager, given the substantial engineering challenges they would pose. These considerations led the intelligence community to advise President Bill Clinton that "North Korea is unlikely to obtain the technological capability to develop a longer-range operational ICBM. North Korea would have to overcome significant hurdles to complete such a program, particularly given the political and economic uncertainties and technological challenges it faces."

In light of these challenges to indigenous long-range missile development, NMD proponents have asserted that there are ways for countries to acquire missiles capable of threatening the United States. The most frequently cited example is the Russian SS-25 ICBM, which forms the basis for Russia's Start space launch vehicle. Currently Russia does not propose transferring components of its weapons system to other countries. But some NMD proponents envision a scenario in which a country contracts with Russia to purchase an SS-25 ICBM to use as a space launch vehicle, only to take the Russian

crew hostage upon the rocket's delivery and convert it into a missile aimed at New York. Even Tom Clancy would have a hard time making this plot believable, and it is difficult understand why national policy should be based on such outlandish imaginings.

According to the United States intelligence community, "We expect countries that currently have ICBMs will not sell them. Each of the countries either is a Missile Technology Control Regime (MTCR) member or has agreed to abide by its terms and recognizes that transfer of an intercontinental range missile would show blatant disregard for the regime. . . . Similarly, we do not believe any country with space launch vehicles will sell them."

Russia is a signatory of the MTCR, which prohibits the export of missiles and their components, and by all accounts is working to ensure its implementation. The Russian aerospace industry has also obtained profitable participation in the international launch services market, and would lose these profits with a major violation of the MTCR. Faced with the choice between the sale of a few missiles to a poor country such as North Korea, or continued sales of many launch vehicles to a variety of rich countries, the self-interest of the Russian aerospace industry clearly supports strict compliance with the MTCR.

These key judgments of the intelligence community were not happily received by missile defense advocates, who realized that their case for an NMD system made little sense in the absence of any apparent new threats. Thus, Congress mandated in 1996 an independent review of the intelligence community's findings and established a panel headed by former CIA Director Robert Gates. To the chagrin of missile defense advocates, the Gates panel concluded that the intelligence community had an even stronger case for its conclusions than had been presented in the original estimate.

Although some rogue countries might wish to acquire the means to strike the United States, intercontinental ballistic missiles constitute the most expensive and challenging option. All of these countries have a demonstrated track record of supporting international terrorist activity, and terrorists would be a far less demanding way to attack the United States. However, such acts against the United States have been rare and ambiguous in origin, suggesting that it is fear of retaliation rather than simple inability to reach America that has deterred potential adversaries. Ballistic missiles leave an unambiguous return address of their launch site, inviting certain retaliation.

Nonetheless, missile defense advocates raise disturbing questions about the adequacy of deterrence in the face of irrational adversaries. Iraq's Saddam Hussein is widely depicted as an implacable foe whose hand, if eventually equipped with long range nuclear missiles, would not be stayed by the threat of retaliatory annihilation. At the time of the Persian Gulf War, it was believed that deterrence failed from the outset, with the Iraqi seizure of Kuwait, and that Saddam represented a new class of "nondeterable threats." More recently it has become clear that while there was little effort to deter Iraq with respect to Kuwait, extensive and successful efforts were made to deter Iraqi use of poison-gas-tipped missiles once the fighting started. After the war, interrogations of captured Iraqi generals made clear that Saddam possessed the means to launch poison-gas missiles, but feared retaliation from the United States, Israel, and other countries.

Rogue states are unlikely to acquire the means to attack the United States with ballistic missiles any time soon. Moreover, even if they eventually do acquire such a capability, they will remain inhibited from using it by the well-founded fear of a devastating American response.

WILL IT WORK?

When missile defense advocates call for the deployment of "effective" defenses, they seldom stop to consider whether such capabilities are at hand, or in prospect. Test results to date have been surprisingly disappointing (even to missile defense skeptics), and combat experience with Patriot missiles in the Persian Gulf War provided stark evidence of the difficulties of achieving effective defenses.

Since 1980 the United States has spent more than \$40 billion on antimissile development and testing. All this time and money has produced only a baker's dozen of tests of the types of interceptors needed for national missile defense. That such a prodigious expenditure of resources should produce such modest results is in itself testimony to the magnitude of the challenge at hand. More revealing testimony to the barriers to an effective defense is found in the fact that in only two of these thirteen tests did the interceptor manage to hit a target. The Homing Overlay Experiments in the early 1980s destroyed a target in one out of four tests, and this was only after the target warhead had been artificially enhanced to make it easier for the interceptor to hit it. The second of two ground-based interceptor tests in the early 1990s also managed to hit its

intended target, but once again the interceptor was given extra help in determining which of several incoming objects was its intended target. The Navy's long-range interceptor has in four tests achieved a total of 42 out of 43 test objects. This sounds like an impressive record until one realizes that the one remaining test objective is actually intercepting or destroying an incoming warhead. The Army's long-range interceptor, which uses technology similar to that which would be used in an NMD system, has also failed to intercept any targets in three recent attempts.

Of course, early testing always reveals problems that with luck and effort can eventually be corrected. But the dismal track record to date suggests that effective defenses remain a goal rather than a reality. If antimissile interceptors have such a poor record in controlled experiments where their designers have months to create the ideal circumstances for success, how can such complicated systems be expected to function in the white heat of combat?

All these plans stand in the shadow of the Gulf War against Iraq, with the subsequent missile defense debates framed by lessons learned—and mislearned—from the war. The antimissile debate during the cold war was mercifully free of combat experience because no nuclear war was fought, and thus, no actual combat data was available to leaven the arguments of proponents or skeptics. The Gulf War gave us our first actual combat experience with antimissile weapons. However, the lessons learned have both illuminated and obscured the antimissile debate.

The bare facts are well established. During 40 days of combat operations, Iraqi forces fired at least 81 modified Scud missiles. All the launches were detected by American early warning satellites, and a total of 157 Patriot interceptor missiles were fired to counter these attacks. The resulting property damage was estimated at several hundred million dollars, and there were numerous casualties, including 28 American soldiers killed by a single Scud that struck a barracks in Saudi Arabia.

What has proved more difficult to establish is how well Patriot worked. During the war, President George Bush claimed that "Patriot works. . . All told, Patriot is 41 for 42—42 Scuds engaged—41 intercepted. . . Patriot is proof positive that missile defense works."

However, as is now well known, the Patriot air defense missile was plagued by problems. Exactly how well it did work may never be known, but post-war analysis has led the Army to conclude that

Patriot missed more often than it hit. There is also compelling evidence that it failed to hit a single Scud over Israel. Patriot fell short precisely because of the problems that missile defense skeptics long suspected would be encountered by any antimissile system: difficulty discriminating between real and decoy targets, and the unreliability of computer software.

Missile defense skeptics had long argued that adversaries could hide incoming nuclear warheads inside a cloud of decoy warheads and other objects that could bewilder the antimissile system's sensors and interceptors. In the ensuing confusion, at least some nuclear warheads would surely make it to their targets. While Saddam Hussein's Scud missiles lacked such sophisticated countermeasures, they did have an annoying tendency to break apart in flight, presenting the Patriot system with an amazing number of potential targets. Too many Patriots were thus expended shooting at harmless pieces of falling Scud parts, and lethal Scud warheads were often missed in the general confusion of combat.

During the cold war, skeptics had also raised concerns that antimissile computer software could never be fully tested in peacetime, and as a result might fail catastrophically in wartime. During the Gulf War the Patriot's computers, which had been designed to operate for only hours at a time, were left on for days at a stretch. As a result, a minor flaw in the radar's software, which had hitherto escaped detection, rendered the radar's computers unable to detect or track incoming Scuds. This previously unsuspected software bug resulted in a Patriot standing by idly in Dhahran when an incoming Scud escaped detection and exploded in the American barracks.

Lessons were learned from the war, and improvements have been made to the Patriot that may enhance its future performance against the Scud. The paltry test results to date will undoubtedly improve in future trials, but there is no reason to hope that any system will demonstrate perfect performance with perfect confidence. Against some conventional threats one might conclude that something was better than nothing. However, against weapons of mass destruction prudent leaders will surely conclude that less than perfect defenses of uncertain reliability provide no more comfort than no defense at all.

AT WHAT COST?

A broad range of factors has combined to extend the missile defense debate. The Republican Party, in its long-awaited congressional ascendancy, was pre-

disposed toward missile defense long before Ronald Reagan showed enthusiasm. The Clinton administration, eager to focus on domestic policy and avoid fractious and distracting foreign policy confrontations with Congress, has gone the extra mile in accommodating the Republican predilection. An increasingly influential military contractor constituency has successfully retained most of the budget share it acquired during the waning years of the cold war. The military services, eager to acquire and retain post-cold war roles and missions, have embraced missile defense as their own, in contrast to their somewhat skeptical stance in earlier years. And traditional outside skeptics of missile defense, their resources sapped by declining public and media issues in defense and foreign policy issues, have found it increasingly difficult to make their voices heard above this chorus of praise.

But whatever institutional or political interests are served by current national missile defense plans, they seem to have little to do with American national interests, or the cause of global peace and security. At best, one might conclude that the present missile defense program, at some \$4 billion each year (which is roughly the level of spending under the Reagan administration) is merely wasteful (though "merely wasteful" in Defense Department terms would be prodigious in other domains). And while the costs of actually deploying an operational system are difficult to estimate, even the modest Clinton administration proposal will require over \$10 billion, while estimates of the more ambitious Republican plans top \$100 billion.

The costs of missile defense are not only economic; there are also real security costs. Long accustomed to the ABM treaty as the precondition to treaties limiting offensive nuclear weapons, Russia has balked at proceeding with further nuclear reductions in the face of Clinton's plans to revise the treaty and Republican calls to abandon it altogether. While the Russians may eventually accept modest revisions to the treaty, in the face of an operational American national missile defense they are likely to keep their remaining nuclear forces on hair-trigger alert, perversely increasing the risk of an accidental or inadvertent launch.

There are also more subtle, though no less important, political costs. National missile defense remains an unworkable solution to a problem that does not exist. And every moment devoted to the missile defense debate is a moment stolen from addressing real solutions to real problems facing America and the world today. ■

"Unless the Senate ratifies the Chemical Weapons Convention before it enters into force at the end of April, Washington will have abandoned a sturdy ship of its own making. . . America's elected officials have the opportunity to rectify their undistinguished track record in addressing the problem of chemical weapons proliferation."

Playing Politics with the Chemical Weapons Convention

AMY E. SMITHSON

In June 1989, a bipartisan group of 73 senators wrote President George Bush, urging him to conclude international negotiations for a "total, verifiable" chemical weapons ban. Bush did so, leaving newly elected President Bill Clinton an accord that had been sought by his five predecessors. For the first two years of his administration, Clinton had ideal conditions to quickly ratify the Chemical Weapons Convention (cwc): the president was presenting a Republican-negotiated treaty for approval, and he could presumably count on the cooperation of Democrats, who formed a majority in the Senate. Clinton dallied, however, not submitting the treaty to the Senate until November 23, 1993, minutes before Congress adjourned for the holidays.

The administration's initial campaign to secure the Senate's approval of the Convention was perfunctory at best. Clinton mentioned the treaty infrequently when he listed foreign and defense policy objectives. Cabinet members testified before relevant congressional committees, but rarely worked the issue at other times. Few senators aside from the upper chamber's resident duo of arms control experts, Richard Lugar (R-IN) and Sam Nunn (D-GA), regularly appeared at hearings to learn the basic facts about the Convention. In short, the administration was going through the motions of a ratification campaign, and the Senate was almost sleepwalking through its constitutional responsibility to provide advice on and consent to international agreements.

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At the close of the 103d Congress in 1994, the administration could have pushed for committee and floor votes, but there was little White House action to back up Clinton's rhetorical embrace of the Convention. Senators, sensing that the treaty was not a White House priority, instead focused on domestic issues that were more meaningful to the midterm elections.

The 1994 Republican revolution elevated arch-conservative Senator Jesse Helms (R-NC) to the chairmanship of the Foreign Relations Committee. Helms did not wait long before taking the cwc, other treaties, and ambassadorial nominations hostage to his quest to revamp the foreign policy bureaucracy and gut the foreign aid budget. No hearings were held on the Convention in 1995, but during the December bartering to resolve the impasse over the Department of State authorization bill, Senator John Kerry (D-MA) managed to secure an agreement requiring committee action on the treaty by April 30, 1996.

At a committee business meeting on April 25, 1996, Helms planned to offer a resolution of ratification with 20 conditions that would have required renegotiation of the Convention or America's abrogation of it. In the face of Helms's scorched-earth legislation, Senator Lugar deftly assembled a bipartisan coalition to substitute a more reasonable bill, which the committee approved by a 13-5 vote. Many in the administration were ready to declare victory, especially after Democratic legislators pressed the new Senate majority leader, Trent Lott (R-MS), to set a September 14 deadline for a floor debate and vote. Meanwhile, a small but vocal band of treaty opponents, underestimated by most in Washington, began executing their plot to sink the Convention.

TORPEDOING A TREATY

The first salvos fired against the CWC took advantage of a paradox that is inseparable from efforts to abolish chemical weapons. Many chemicals found in ordinary commercial products, such as flame-retardant materials, pharmaceuticals, and fertilizers, can also be used in chemical weapons. With the ubiquity of such products in modern life, the negotiators could hardly have decreed their elimination in order to get at the chemical weapons problem. The treaty instead contains extensive verification provisions to guard against commercial facilities serving as a facade for covert chemical weapons production.

The Convention's data declarations will for the first time enable the tracking of global trade in chemicals that could pose a proliferation risk. Routine inspections will confirm the accuracy of these declarations and the absence of chemical weapons-related activities in the industrial sector. The treaty also breaks new ground with challenge inspections, which will be launched on short notice to investigate charges of cheating, whether at commercial or government sites. Both routine and challenge inspections may involve questioning personnel, reviewing records, sampling and analyzing chemical compounds, and obtaining access to various areas of a facility. When the United States proposed these tough verification measures in 1984, few believed that the Soviet Union or other countries at the negotiating table would ever agree to routine, much less challenge, inspections. Yet over 160 governments have signed the Convention.

The treaty's verification provisions were devised in cooperation with American industry, which began working with negotiators in the late 1970s to fashion treaty provisions that would enable verification but protect confidential business information. The United States Chemical Manufacturers Association, which represents more than 90 percent of America's chemical manufacturing capacity and the majority of facilities that would be involved in treaty-monitoring activities, spearheaded the industry's coalition effort. Chemical companies tested the data declaration forms, helped the government draft the treaty's implementing legislation, and allowed trial inspections at their facilities to evaluate the verification provisions.

Early in June 1996, Helms warned his Senate colleagues that the Convention "may compromise trade secrets," circulating a confidential list of American companies possibly affected by the treaty. At the end of July, Helms distributed press releases

across the country to alert the states where he asserted private industry would be "hardest hit" by the Convention. Analysis prepared by two conservative Washington, D.C., think tanks fueled Helms's efforts. Senator John Kyl (R-AZ) joined Helms's crusade against the treaty, and the myth that the Convention would ravage United States industry began to transform into political reality within the halls of the Senate. In particular, treaty opponents asserted that small businesses would be overwhelmed by the burdens the Convention would place on them.

Appalled, chemical industry representatives repeatedly told the Senate that the treaty's verification requirements were reasonable and acceptable. Moreover, they explained that without ratification the treaty's automatic economic sanctions, which United States negotiators had pushed to put pressure on hold-out states, would backfire on the United States chemical industry. If the treaty were not ratified, United States chemical trade would decline by at least \$600 million and many American jobs would be lost.

Normally, when an industry with \$65 billion in exports makes the rounds on Capitol Hill, senators pay close attention. In this case, many Republican senators turned a deaf ear to the industry's arguments for the Convention, listening instead to a handful of former Reagan officials claiming to represent industry's interests. Endorsements poured in from the Pharmaceutical Research and Manufacturers of America, the Synthetic Organic Chemical Manufacturers Association of America, the Biotechnology Industry Organization, the Business Executives for National Security, and other business groups. Even when an organization representing more than 600,000 small businesses, the National Federation of Independent Business, later announced that "it is 100 percent incorrect...that NFIB opposes" the treaty, rumors that the CWC would harm American companies continued to circulate.

Treaty opponents launched another line of argument, asserting that the Convention's verification provisions would breach Fourth Amendment rights prohibiting unlawful searches and seizures and Fifth Amendment protections against self-incrimination. Article VII of the treaty, however, calls for its implementation "in accordance with [each state's] constitutional processes." Legal scholars Abram Chayes and Louis Henkin note that the treaty allows alternative means of inspection to be used if inspectors' requests for information, samples, or other forms of access are deemed unreasonable. The Convention's "managed access"

inspection procedures and United States implementing legislation provide numerous mechanisms to protect sensitive and proprietary information. Chayes has concluded that the "convention in its final form is thus fully consistent with United States constitutional requirements."

Intervention by Clinton and his cabinet might have reversed the tide against the treaty, but instead the White House counted on senators to follow Lugar's lead and left the treaty in the hands of staffers. As the summer waned, treaty adversaries also revived a tried-and-true battle cry against arms control: the Convention was unverifiable. "Verifiability"—a measure of how well cheating can be detected—has long been a key litmus test for arms control accords. The Convention's opponents insisted that the treaty would not detect violations with high confidence. This argument appeared to clash with a frequent refrain of treaty advocates that the Convention contained novel and very intrusive verification provisions. Both statements, however, are correct.

For decades, United States reconnaissance satellites have been able to detect missile silos, mobile missiles, nuclear test preparations, and other nuclear activities. However, the signs of chemical weapons proliferation are not readily picked up by satellites, partly because many chemical companies use modern environmental safeguards that make it difficult to pinpoint possible covert weapons sites. Given the large number of chemical facilities worldwide, even the Convention's rigorous verification measures cannot provide an ironclad guarantee that all instances of small-scale cheating would be detected.

Conceding this fact, former CIA director James Woolsey nonetheless testified that the Convention would bring "a new tool to [the intelligence community's] collection tool kit [that could] help resolve a wide variety of problems." Writing in the February 11, 1997, *Washington Post*, two other distinguished national security authorities, Brent Scowcroft and John Deutch, observed that "debates about various definitions of 'effectively verifiable' miss the point. The limits imposed by the CWC surely are imperfect, but since we are unilaterally abandoning chemical weapons in any case, it is hard to see how its imperfect constraints are worse than no constraints at all."

Treaty opponents also dusted off the "universal adherence" argument, noting that chemical prolif-

erators such as Libya, North Korea, and Syria would simply ignore the Convention. They forgot to mention, however, that approximately two-thirds of the countries on the intelligence community's proliferation watch list have already signed the Convention. The treaty will gradually deny any remaining hold-out states supplies of chemical weapons ingredients, making it more difficult for them to augment their arsenals. In short, the Convention will contain and eventually reverse the proliferation problem as hold-out states succumb to the added economic and political isolation brought about by it.

POLITICAL UNDERTOW

In a radio address days before the Senate's scheduled debate on the treaty, Clinton observed that ratification of the Convention would reduce the threat of chemical weapons. While the press overlooked Clinton's remarks, conservative columnists filled newspaper op-ed pages with dire warnings against the Convention. In addition, the opposition enlisted former Defense Secretaries Caspar Weinberger and Richard Cheney, as well as several other Reagan and Bush officials. Two Clinton cabinet members published a lone riposte, but otherwise the administration was publicly silent. As the hours passed and Clinton's cavalry did not saddle up, the hopes of the Convention's advocates began to flag.

The death blow was dealt by Republican presidential candidate Bob Dole, who on September 11 declined to support the Convention unless it was "effectively verifiable and genuinely global." By the next morning even Lugar could not assemble the needed two-thirds majority. Approximately 35 Republicans had indicated they would vote against the Convention. Facing defeat, the White House agreed to postpone a vote indefinitely.

What happened? Perhaps the most obvious explanation of this outcome is that the Convention was a victim of election-year politics. The Republicans were just as eager to deny Clinton a foreign policy victory as Clinton was to avoid a foreign policy defeat. Such political calculations may have spurred the Republicans to scuttle a Republican-negotiated treaty and the White House to favor the easy road over the more politically assertive one.

Another possible explanation of this outcome is a regrettable combination of neglect and ignorance of a serious problem. Far too few in Washington have recognized the changing nature of post-cold

war security threats. A quick glance at history reveals that while nuclear weapons are held in reserve, chemical weapons are used—as recently as the Iran-Iraq War in the 1980s. The number of suspected chemical weapons possessors—more than 20—is roughly triple the membership of the nuclear weapons club. Given the relative availability and inexpensiveness of chemical weapons ingredients, poison gas has become a favored weapon of governments and, perhaps more ominously, terrorists. In March 1995, the religious cult Aum Shinrikyo released the nerve agent sarin in a crowded Tokyo subway, killing a dozen people and injuring more than 5,500. This act broke a taboo against the terrorist use of weapons of mass destruction and provided a horrifying example for other terrorists to follow.

Chemical terrorism may already have surfaced in the United States. Evidence indicates that the 1993 World Trade Center bomb also included cyanide gas. Only a mistake on the part of the bombers saved the thousands of people in the building. In other words, so far Americans have been lucky. Were Washington policymakers paying better attention, they would understand that the security dilemmas of the future are less about mutual assured destruction and more about mutual vulnerability to poison gases and deliberately spread diseases.

ABANDONING SHIP

One of the oldest gambits used to defeat a proposed policy or program is to play both ends against the middle. In this instance, treaty opponents have simultaneously described the Convention's verification measures as so tough that they would breach United States constitutional rights and not tough enough to catch violations elsewhere. As noted earlier, the treaty has ample mechanisms to protect constitutional rights. Moreover, monitoring a chemical weapons prohibition is at least an order of magnitude more difficult than monitoring a nuclear weapons treaty. The Convention's verification provisions are designed to detect militarily significant violations. Inspection procedures capable of exposing each and every small violation would not only shred the United States Constitution, but would result in the loss of confidential business and national security information. As drafted, the Convention balances the need for intrusive verification with the need to protect property and privacy. Assuming that the United States and other participating countries remain vigilant about exercising their right to conduct challenge

inspections, senators can be reasonably confident that inspectors will uncover militarily significant cheating in a timely fashion.

With some reflection, senators might also realize the absurdity of the opponents' argument that adherence to the Convention must be immediate and universal. Foreign and defense policy goals are not achieved overnight; they are articulated and pursued over the long term. Those who insist on instant universal adherence to the Convention are in effect ceding the role of setting the standards of acceptable international behavior to Muammar Qaddafi and Saddam Hussein. United States national interests would be much better served by establishing the illegality of chemical weapons development and possession and working persistently thereafter to eliminate poison gas.

Unless the Senate ratifies the Convention before it enters into force at the end of April, Washington will have abandoned a sturdy ship of its own making. Consequently, the Convention's debut will be somewhat hollow: Russia, which outranks the United States as the world's largest chemical weapons possessor, will not ratify before the United States does.

At a time when important precedents will be set, not ratifying the treaty means that the United States will lose its vote on how the treaty operates. No Americans will be hired at the international inspectorate, and Washington will be denied formal access to the information this agency gathers about chemical activities in other countries. In short, not ratifying the treaty will marginalize the United States; Washington's absence will undermine the nascent chemical weapons nonproliferation regime and may jeopardize its long-term legitimacy.

Whether the Convention was sidelined by politics or neglect, both reasons are unacceptable, especially in the area of the stewardship of United States defense and foreign policy. At the beginning of the second Clinton administration and the 105th Congress, America's elected officials have the opportunity to rectify their undistinguished track record in addressing the problem of chemical weapons proliferation.

THE ELEVENTH HOUR

On October 31, Hungary became the sixty-fifth nation to deposit its instrument of ratification with the United Nations, triggering a countdown of six months until the treaty's entry into force. The Clinton administration faced a considerable challenge—albeit one partly of its own making—in gaining

Senate approval before the April 29, 1997, deadline. So early in a new Congress, members are loath to make major decisions. The Republican majority would be more inclined to inaugurate the session with its own agenda. Finally, Helms, having been reelected, was sure to resort to his familiar tactics. Unless Clinton wanted to begin his second term with an undeniable security and foreign policy failure, he had no choice but to step up the intensity of his administration's campaign to secure the Senate's advice and consent to ratification.

Clinton began by personally telephoning Majority Leader Lott to ask that a vote be scheduled and sending his new national security adviser, Samuel Berger, to discuss the issue further with Lott. The senior Mississippi senator then decided that he would appoint a task force of nine Republicans to weigh the issue. Among Lott's appointees were three treaty supporters; the other six were moderately or adamantly against the Convention. Lott's decision to create a task force could be read either as a way to find compromises suitable to the treaty's most entrenched Senate opponents or as a way to insulate himself from the matter and delay action on the treaty. As for Helms, his recommendation to Lott was that the Senate not take up the Convention until other Republican priorities had been addressed, including the restructuring of the State Department and the comprehensive reform of the United Nations. In other words, Helms took the treaty hostage again.

Meanwhile, Clinton's new secretary of state, Madeleine Albright, and secretary of defense, former Republican Senator William Cohen, began actively promoting the Convention. After meeting with Albright in early February, former President Bush declared that a vote on the Convention "should be beyond partisanship. . . We don't need chemical weapons, and we ought to get out front and make clear that we are opposed to others having them." Endorsements also began to appear from such prominent individuals as former Secretary of State James Baker 3d, General Norman Schwarzkopf, and Admiral Elmo Zumwalt, Jr.

The situation is nearing critical mass. Lott is hearing two crucial messages with increasing frequency. First, the Convention is, on balance, in United States interests. Second, this matter is a test of his leader-

ship because the Convention is so widely endorsed and has enjoyed bipartisan support. If Lott does not soon pry the treaty from Helms and schedule a vote, Clinton himself can be expected to step up to the presidential bully pulpit on behalf of the treaty, further escalating the pressure.

Although the outcome of this saga will directly alter the effectiveness of chemical weapons non-proliferation efforts, the manner in which Washington has handled the Convention has more far-reaching implications. Unless the Senate logjam is broken, the paralysis that has suspended the Convention threatens to engulf other arms control accords, such as the recently concluded Comprehensive Test Ban Treaty. During the last two Congresses, more than 15 other environmental, trade, and criminal justice treaties have also stacked up in the Foreign Relations Committee. America's leaders need to break the post-Vietnam habit whereby both ends of Pennsylvania Avenue continually jostle for control of the ship of state. Especially on essential security issues, the White House and Congress must rise above politics and work together.

The consensus view is that United States foreign policy should seek to reduce security threats, improve trade relationships, and foster cooperation on such matters as the environment and human rights. As the vestiges of the cold war and the accompanying restraints of bipolarity dissolve into an increasingly unruly world, strategies for achieving these goals remain unarticulated. Most agree, however, that the economic and political costs of being a full-time international policeman would bankrupt America.

A sensible alternative to global hegemony is for Washington to invest seriously in creating and strengthening new rules of positive international behavior. Though sometimes difficult to orchestrate, multilateral mechanisms can be a cost-effective route to reducing security threats and inducing cooperation in other areas. The Chemical Weapons Convention, one of many treaties that would help to set and reinforce positive behavioral norms, is an obvious step in the right direction. Surely Washington can find the determination to outlaw chemical weapons. If not, United States foreign policy is definitely adrift. ■

"After decades of neglect and complacency, the proliferation of biological weapons is finally receiving the attention it deserves. Whether the international community can summon the political will to buttress the [biological weapons convention] with effective compliance-monitoring and enforcement measures will have a significant impact on the future spread—and potential military use—of these abhorrent weapons."

The Biological Weapons Threat

JONATHAN B. TUCKER

Biological warfare has been likened to "public health in reverse" because it involves the deliberate cultivation and dissemination of disease agents. The recent spread of these heinous weapons to about a dozen countries, and the potential enhancement of their military effectiveness through molecular biotechnology, have given impetus to international efforts to strengthen the existing biological disarmament regime.

In contrast to chemical weapons, which are synthetic supertoxic compounds such as sarin and mustard gas, biological-warfare (bw) agents are living microorganisms and nonliving natural toxins that can cause disease in humans, animals, or crops. Examples of microbial bw agents include bacteria (anthrax, brucellosis, tularemia, plague), viruses (Venezuelan equine encephalitis, smallpox), rickettsia (Q fever), and fungi (the molds that cause stem rust of wheat and rye). Toxin-warfare agents include botulinum toxin, ricin, saxitoxin and trichothecene mycotoxins.

The characteristics and effects of various bw agents vary considerably. Anthrax infection is usually fatal if untreated, whereas tularemia bacteria and the Venezuelan equine encephalitis virus cause nonfatal but debilitating illnesses that would incapacitate troops. bw agents also differ in their ability to persist in the environment. Anthrax bacteria form rugged spores—analogous to microscopic seeds—that can contaminate soil for decades, while most other microbial agents are rapidly degraded by sunlight, heat, and drying. Finally, the large majority of bw agents are infectious but not conta-

gious, meaning that they infect people directly exposed to an attack but do not spread from one individual to another. This characteristic makes military sense by removing the risk that the agent will trigger an uncontrolled epidemic that could boomerang against the attacker. Nevertheless, a few putative bw agents, including pneumonic plague bacteria and hemorrhagic fever viruses such as Ebola, are highly contagious. These agents would presumably be employed in deep operational and strategic attacks far from friendly forces or populations.

Although toxins generally act within several hours, clinical symptoms of infection with microbial agents do not appear until a few days after exposure. For the first 24 to 48 hours after inhalation of anthrax spores, the early signs of infection resemble a mild cold, including fever, malaise, and nonspecific chest pain. Within three to five days acute illness sets in, with vomiting, chills, and high fever, followed by a series of gruesome symptoms. The skin erupts with blisters and turns black and leathery, the lungs fill with fluid, the brain tissue swells, the extremities turn blue from lack of oxygen, and the victim goes into shock followed by coma and death. Unless intravenous antibiotic therapy begins before the appearance of acute symptoms, treatment is considered hopeless.

WHAT IS THE THREAT?

The ability of pathogenic microbes to multiply within the host, and the extraordinary potency of certain bacterial toxins, means that even small quantities of these agents can have devastating effects on unprotected populations. Thus, when anthrax spores are disseminated through the air as an aerosol—a cloud of microscopic particles that

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remains suspended in the atmosphere for long periods and can be inhaled deep into the lungs—the spores can infect large numbers of people. Indeed, only 10 grams of anthrax spores disseminated over a square mile could cause as many fatalities as a metric ton of the chemical nerve agent sarin. Unlike a natural epidemic, which spreads gradually over a period of weeks or months, a BW attack would produce a massive, nearly simultaneous outbreak of disease in the infected population.

When released upwind of a target, BW agents are undetectable by human senses. Depending on the particular target, the robustness of the microbial agent, and the prevailing atmospheric conditions, downwind ranges of more than 100 kilometers are feasible. Large-scale releases of anthrax over densely populated areas could result in massive casualties comparable to those inflicted by a megaton-range nuclear blast, but without the physical damage to buildings and infrastructure.

The acquisition of a nuclear arsenal requires a massive investment of wealth and technical expertise, but even relatively poor states can afford a BW capability. Biological weapons can inflict far more casualties per dollar of investment than either chemical or nuclear weapons. One reason is that the production of microbial and toxin agents does not require rare and costly ingredients. Pathogenic and toxin-producing microorganisms are widely used in legitimate biomedical research and can be purchased from biological supply houses.

Failing that, seed cultures of anthrax and other BW agents can be obtained from natural sources, such as diseased animals or soil.

Furthermore, nearly all the equipment required for the production of BW agents is "dual-use," meaning that it has legitimate commercial applications in the pharmaceutical and biotechnology industries. Thus, any country capable of manufacturing beer, wine, yogurt, single-cell protein, biopesticides, vaccines, or antibiotics has sufficient equipment and expertise to produce crude preparations of BW agents such as anthrax or botulinum toxin.

This situation has been exacerbated by the dramatic growth of the new biogenetic technologies and their extensive applications in medicine, agriculture, and industry. Biotechnology is rapidly becoming a global industry, a trend accelerated by foreign investment and lowered trade barriers. While this development offers real social and economic benefits for developing countries, it has a dark side in that the

equipment, knowledge, and materials relevant to biological weapons are becoming more widespread.

Advances in fermentation technology have reduced the size of militarily significant BW production facilities to the point where a clandestine plant could be erected inside a small warehouse or underground, making it exceedingly difficult to detect. Alternatively, a vaccine plant that normally manufactures a legitimate product could switch to the production of BW agents or maintain a latent capability to do so during wartime, a phenomenon known as "virtual proliferation." It has also become possible to cultivate BW agents from seed cultures to militarily significant quantities in days or weeks, rather than several months. This development has obviated the need to maintain a stockpile of biological weapons in cold storage, since the agents could be produced to order shortly before their intended use. At the same time, advanced cell-culture techniques have made it possible to cultivate large quantities of viruses, which, unlike bacteria, can grow only inside living animal cells. Finally, techniques for the "cloning" (multiplication) and expression of toxin genes in bacteria can yield kilogram quantities of formerly rare protein toxins.

Biological warfare has been employed sporadically throughout military history.

Although microbial agents are of natural origin, they can be manipulated in the laboratory to increase their infectivity, virulence, resistance to standard vaccines and antibiotics, and persistence in the environment. Some analysts worry that advances in recombinant-DNA technology could also make it possible for states or terrorists to devise novel "supergerms" against which there is no defense or that could be used to target specific ethnic groups. Such nightmare scenarios appear exaggerated, at least for the foreseeable future. Genetic engineering can make natural microbial pathogens more deadly, but it is unlikely to yield entirely novel agents or to remove the uncertainties associated with biological warfare.

While the fact that small quantities of BW agents are militarily effective makes production, concealment, and transportation fairly easy, the process of "weaponization" poses technical hurdles to acquiring an operational capability. This step involves stabilizing microbial agents to maintain their viability, infectivity, and virulence prior to use, and developing an efficient means of delivery. To inflict mass casualties, an attacker must generate an aerosol cloud of microscopic particles or droplets small enough to cause pulmonary infection. (Examples

of visible aerosols are smoke and fog.) Since microbial and toxin agents are solids that do not give off toxic vapors, they would be disseminated as either a liquid slurry or a dry powder. Possible means of delivery range in complexity from an agricultural sprayer mounted on a truck, boat, or crop-dusting aircraft (which would be sufficient for indiscriminate area attacks) to more precise dispersal systems such as an artillery shell, rocket, aerial bomb, ballistic-missile warhead, or cruise missile.

WHO HAS THEM?

Biological warfare has been employed sporadically throughout military history. In antiquity, Greek, Persian, and Roman armies poisoned enemy wells with cadavers. During the Middle Ages, the Black Death—the devastating epidemic of bubonic plague that killed a quarter of Europe's population between 1346 and 1350—began when Tartar forces besieging a Genoese fort in the Crimean town of Kaffa catapulted some of their own plague victims over the ramparts. The Genoese defenders contracted the disease and fled back to Italy, from whence the epidemic spread rapidly across Europe.

In 1763, British forces garrisoned at Fort Pitt (present-day Pittsburgh) gave blankets contaminated by smallpox to rebellious Indian tribes in a deliberate attempt to infect them with the disease. In World War I, German saboteurs covertly spread the bacterial disease glanders to kill enemy horses, which played a key role in military logistics. During World War II, the major powers all had active BW programs. The United States built large-scale production facilities for a variety of antipersonnel and anticrop agents. In 1944, British Prime Minister Winston Churchill seriously considered the use of anthrax for the strategic bombing of German cities, but abandoned the idea when the tide of war turned in the Allies' favor.

Between 1932 and 1945, the Japanese army ran a top-secret BW facility in occupied Manchuria known as Unit 731, where scientists cultivated deadly bacteria (including plague, anthrax, gas gangrene, typhus, and typhoid) and tested them on prisoners of war. In 1940, Japanese military aircraft dropped ceramic bombs containing plague-infested fleas and grain—to attract disease-spreading rats—on 11 Chinese cities, triggering deadly epidemics. After the war, American officials learned the secrets of Unit 731 but agreed not to prosecute the responsible Japanese officers as war criminals in exchange for access to their illicitly acquired data.

During the 1950s and 1960s, the United States and the Soviet Union had offensive BW programs that achieved major technical advances in the large-scale fermentation of microbial pathogens, the stabilization and preservation of these agents in liquid and dry forms, and their dissemination as respirable aerosols. The United States Army tested the dispersal efficiency of BW agents in 239 secret open-air releases of bacterial simulants in densely populated areas such as the New York City subway, Washington's National Airport, and San Francisco's harbor.

On November 25, 1969, after a government policy review had cast doubt on the military utility of biological weapons, President Richard Nixon ordered the offensive BW program halted and all microbial stockpiles destroyed. The ban was extended to cover toxins in February 1970, although research and development on BW defenses (such as vaccines, antibiotics, detectors, and protective gear) were allowed to continue. America's unilateral renunciation of its offensive BW program opened the way for the rapid negotiation of the 1972 Biological and Toxin Weapons Convention (BWC), a total ban on development, production, and stockpiling that entered into force in 1975.

During the following decades, the United States repeatedly alleged that the Soviet Union, a major party to the BWC, was systematically violating the treaty. In April and May 1979, an unusual epidemic of human anthrax in the Soviet city of Sverdlovsk claimed at least 68 lives. Washington said that the outbreak had been caused by the accidental release of anthrax spores from a military biological facility, but Moscow insisted that the source had been consumption of contaminated meat. It was not until 1994 that an independent analysis of the pathological and epidemiological evidence demonstrated conclusively that the epidemic had involved pulmonary rather than intestinal anthrax, providing strong support for the United States position.

In 1981, the United States charged that the Soviet Union and its Communist allies were using a mixture of fungal toxins known as "yellow rain" against resistance forces and civilians in Laos, Cambodia, and Afghanistan. But scientific skeptics pointed to gaps and inconsistencies in the United States government's case, and a team of experts assembled by the United Nations to investigate the matter was denied access to the areas where the toxin attacks had reportedly occurred. As a result, the American allegations could not be definitively proved or refuted.

In 1989, a Russian microbiologist named Vladimir Pasechnik defected while attending a con-

ference in London. He provided firsthand information indicating that Moscow had a top-secret offensive BW program under way in several military and ostensibly civilian facilities that involved multiple agents, including the development and production of a genetically-engineered form of plague that was resistant to standard antibiotics. Although Soviet President Mikhail Gorbachev strongly denied these allegations, his successor, Russian President Boris Yeltsin, admitted in a speech on January 29, 1992, that Soviet/Russian implementation of the BWC had been "delayed" for nearly 20 years. On April 11, 1992, Yeltsin issued an edict committing Russia to comply with the BWC, but the United States continues to have unspecified "concerns" about Russian compliance.

The 1991 Persian Gulf War was a wake-up call for United States military planners with respect to the strategic implications of biological weapons in a regional conflict. Although United States intelligence had concluded that Iraq had a BW capability, including supplies of anthrax and botulinum toxin, postwar investigations of Iraq's weapons programs by the United Nations Special Commission (UNSCOM) on Iraq revealed that the United States had grossly underestimated the scale and scope of the Iraqi effort.

After the defection in August 1995 of Lieutenant General Hussein Kamel Hassan Majeed, a son-in-law of Saddam Hussein and the mastermind of the Iraqi BW program, Baghdad admitted that it had produced and weaponized three BW agents: anthrax, botulinum toxin, and aflatoxin (a fungal poison). Before the Gulf War began, aerial bombs and Scud missile warheads were filled with concentrated slurries of these agents and deployed at four locations. Saddam Hussein delegated to local commanders the authority to fire the weapons against Israel or Saudi Arabia in the event that Baghdad came under nuclear attack. Although Iraq claims to have destroyed its entire biological arsenal after the Gulf War, it has offered no tangible evidence, and UNSCOM officials suspect that a hidden biological stockpile may still exist.

In 1996, investigations for the South African Truth and Reconciliation Commission revealed that from the mid-1980s to the last years of apartheid rule in the early 1990s, South African army scientist Wouter Basson ran a secret chemical and biological weapons program known as Project Coast, or Project B. In testimony before the truth commission, senior officials of the governing African National Congress alleged

that the apartheid government used chemical and biological agents against black-liberation groups in neighboring countries, as well as against ANC and other antiapartheid figures. In 1993, President Frederik W. de Klerk halted the offensive program and ordered the stockpiles destroyed, although production records were reportedly retained.

Current BW programs are shrouded in secrecy, but roughly a dozen countries in addition to Russia are suspected of possessing or pursuing these weapons. Biological proliferators generally possess chemical weapons as well and are concentrated in two conflict-ridden regions of the world: the Middle East and North Africa, and East and Southeast Asia. Some lists of BW proliferant states also include Cuba, which has a sophisticated biotechnology industry.

THE DESIRE TO ACQUIRE

The primary motivation for the acquisition of biological weapons is to deter a potential adversary that has obtained nuclear, chemical, or biological weapons of mass destruction. Of the three types, biological weapons are most accessible to developing countries because they require the least capital and technological infrastructure. At the same time, the secrecy surrounding BW programs suggests that, unlike nuclear weapons, biological weapons have no "prestige" value. The moral revulsion evoked by these weapons makes them more of a stigma or a provocation than a source of national pride.

Biological weapons in the hands of rogue states pose a serious threat to Western interests. . .

States hostile to the West, such as Iran, Iraq, and Libya, may view an offensive BW capability as an inexpensive but effective counter to Western technological superiority in conventional arms. In particular, the perception that the United States and Israel are unwilling to accept heavy casualties in combat could make biological weapons attractive to hostile states. A biological arsenal might serve as the basis of an "asymmetric strategy" in which, instead of confronting a superior conventional military power head-on, the weaker state employs biological weapons to inflict high casualties, spread terror, and undermine the enemy's will to fight.

In general, biological weapons have limited tactical utility on the battlefield. Chemical agents can be delivered over limited ranges, have immediate effects, and may cause a persistent contamination threat, whereas microbial agents are strongly influenced by wind and weather conditions, do not generally create a persistent hazard in the attack area, and have delayed effects, causing incapacitating

symptoms only after an incubation period of two to five days. Toxin agents typically act more rapidly than microbial agents, but more slowly than chemical agents. Because of these characteristics, biological weapons are best suited for deep operational and strategic missions. Possible scenarios include attacks against fixed enemy positions in a war of attrition, special-operations missions against command bunkers and troop concentrations in rear areas, and attacks on "soft" targets such as harbors, airports, and staging areas. Cities might be targeted when the objective is to inflict indiscriminate casualties and sow panic. Plant and animal pathogens might also be delivered against enemy crops and livestock to cause starvation or economic hardship and undermine civilian morale.

Three factors appear to have inhibited the employment of biological weapons in modern warfare (with the exception of the limited Japanese use during World War II). First, BW programs in many proliferant states are only now reaching a level of weaponization where a successful attack might be contemplated. Second, military planners in proliferant states may be uncertain about strategy and tactics for biological warfare, which has never been conducted on a large scale. Finally, leaders of countries pursuing BW programs may be deterred by recognition that the political consequences of biological weapons use would be much greater than those associated with chemical warfare and could provoke severe military retaliation. Even "rogue" states appear to view biological agents as "weapons of last resort," to be brandished or used only in the face of total military defeat. Since regional conflicts to date have been limited in nature, the threshold for biological warfare has not yet been reached. Still, biological weapons in the hands of rogue states pose a serious threat to Western interests because of the potential for military delivery against intervention forces and allied populations, or transfer to state-sponsored terrorists for use against civilian targets.

Potential users of biological weapons include not only rogue states but also individuals or terrorist groups motivated by religious fanaticism, supremacist ideology, or apocalyptic prophecy. Because these weapons cause mass casualties, terror, and panic, they are potent instruments of social disruption. The Japanese Aum Shinrikyo cult that released the chemical nerve agent sarin on the Tokyo subway in March 1995, killing 12 commuters and injuring more than 5,000, had built a well-equipped biological laboratory where cult members were producing lethal biological agents such as anthrax and

botulinum toxin. In 1993 the cult deliberately released anthrax spores from an office building in Tokyo, but technical problems rendered the attack ineffective. Had the cult persisted, however, it could well have overcome these hurdles. Aum Shinrikyo's ultimate objective was to bring down the power structure in Japan and replace it with the cult's own shadow-government.

A few domestic terrorists in the United States have tried to acquire biological weapons but were arrested before carrying out a lethal attack. In 1984, two members of an Oregon cult headed by Bhagwan Shree Rajneesh cultured salmonella (food-poisoning) bacteria and used them to contaminate salad bars in an effort to disrupt a local referendum on whether to expel the cult; 750 people fell ill and 45 were hospitalized. In March 1995, two members of a right-wing militia called the Minnesota Patriots Council were convicted of conspiracy for planning to use a toxin (ricin) to assassinate federal tax officials. And in May 1995, authorities arrested a member of the white supremacist group Aryan Nation after he ordered three vials of freeze-dried plague bacteria from a Maryland supply house.

Current defenses against biological warfare are deeply flawed, and large-scale civil defense is considered impracticable. Gas masks can effectively screen out the microscopic particles in a BW aerosol, but American military forces lack "real-time" detectors capable of spotting aerosols in the atmosphere fast enough for troops to don their gas masks before being exposed. (Development of improved BW-agent detectors is now a top military priority.) Although vaccines can shield against infection with standard BW agents such as anthrax, troops must be inoculated months in advance to allow immunity time to develop. Such medical defenses might also be countered by the use of nonstandard BW agents (such as hemorrhagic fever viruses) or genetically modified strains of standard agents that are resistant to existing vaccines and antibiotics.

IN SEARCH OF SOLUTIONS

An informal suppliers' cartel known as the Australia Group was established in 1984 in response to Iraq's use of chemical weapons during the Iran-Iraq War. Comprising 30 countries, the group's aim is to impede the proliferation of chemical and biological weapons by harmonizing national export controls on chemical precursors, dual-use equipment, and microorganisms and toxins that could be used for weapons production. Nevertheless, the rapid diffusion of industrial biotechnology throughout the

world has made it increasingly difficult to control the sale of dual-use equipment. Proliferant states have also become more adept at devising networks of front companies and suppliers to frustrate export controls. Because of the profits to be made through illicit trade, some unscrupulous Western firms have been willing accomplices. For these reasons, supply-side measures such as export controls can buy time but do not represent a long-term solution to the bw proliferation problem.

A more promising approach is demand-side non-proliferation strategies that create disincentives for pursuing biological weapons in the first place. These measures seek to reinforce the international norm that biological warfare is beyond the pale of civilization, and that any state engaging in such behavior will suffer severe political, economic, and even military consequences.

The first treaty to constrain biological warfare was the 1925 Geneva Protocol, which was negotiated in the aftermath of the large-scale use of chemical weapons in World War I. This accord banned the use of chemical and bacteriological weapons but did not constrain their development, production, testing, or stockpiling. Many nations that ratified the Geneva Protocol also reserved the right to retaliate in kind to a chemical or biological attack, effectively reducing the treaty to a "no first use" agreement. The 1972 bwc sought to close these loopholes by banning the development, production, stockpiling, and transfer of microbial and toxin agents for offensive military purposes.

Although the bwc has been ratified by 139 countries, it has two basic weaknesses. First, because of the dual-use nature of microbial pathogens (which are widely used in legitimate biomedical research and the production of protective vaccines), the bwc allows countries to produce and stockpile microbial pathogens and toxins "in types and quantities" consistent with "prophylactic, protective and other peaceful purposes." Thus, the line between treaty-permitted and -prohibited activities is largely a question of intent. With the development of advanced fermentation methods, which have made it possible to produce militarily significant quantities of an agent in a matter of days or weeks, quantitative distinctions have been effectively rendered obsolete.

Second, the bwc's lack of formal verification measures has made it toothless and unable to address a series of alleged violations. When the treaty was negotiated, verification was considered unnecessary because biological weapons were thought to have little military utility, and infeasible because the

Soviet Union and other states objected strongly to intrusive on-site inspections. Both of these perceptions have changed in recent years. Since 1986, states that are party to the bwc have sought to strengthen the treaty by adding voluntary but politically binding transparency measures such as annual reports listing high-containment research facilities and unusual outbreaks of disease. Participation in these measures has been disappointing, however; in 1996, just 52 of the 139 parties submitted declarations, suggesting that only legally binding measures will be widely respected.

Since early 1995, an ad hoc group of bwc parties has met periodically in Geneva to negotiate a legally binding protocol that will enhance confidence that countries are living up to their treaty obligations. Possible options for this compliance regime include routine inspections of dual-capable biological facilities to check the accuracy of declarations; "challenge" inspections to pursue suspected violations at declared or undeclared facilities; and field investigations of alleged bw use or unusual outbreaks of disease.

At present, the ad hoc group is split over the scope, scale, and intrusiveness of the compliance regime. A major concern is that on-site inspections of dual-capable pharmaceutical plants could compromise proprietary information worth millions of dollars, such as the DNA sequences of genetically engineered bacteria that produce valuable drugs. Inspection measures will therefore have to be intrusive enough to detect and deter violations while safeguarding trade secrets and national-security information unrelated to the bwc. Because of these complications, the talks are moving slowly. Although the United States has pushed for completing the compliance protocol by 1998, a more realistic deadline may be the next bwc review conference in 2001.

Until the bwc compliance protocol enters into force, state parties to the treaty should enhance the openness and transparency of their commercial biological activities and defensive programs to allay suspicions. The international community should also strive to resolve the festering regional conflicts in the Middle East and East Asia that are at the center of the bw proliferation problem.

After decades of neglect and complacency, the proliferation of biological weapons is finally receiving the attention it deserves. Whether the international community can summon the political will to buttress the bwc with effective compliance-monitoring and enforcement measures will have a significant impact on the future spread—and potential military use—of these abhorrent weapons. ■

"Because of the global upsurge in ethnic and sectarian conflict, policymakers have become more attuned to the role played by [light] arms in sparking and sustaining low-level warfare and have begun to consider new constraints on trade in these munitions. . . . Although heavy weapons sometimes play a role, most of the day-to-day fighting is performed by irregular forces armed only with rifles, grenades, machine guns, light mortars, and other 'man-portable' munitions."

The New Arms Race: Light Weapons and International Security

MICHAEL T. KLARE

For most of the past 50 years, analysts and policymakers have largely ignored the role of small arms and other light weapons in international security affairs, considering them too insignificant to have an impact on the global balance of power or the outcome of major conflicts. Nuclear weapons, ballistic missiles, and major conventional weapons (tanks, heavy artillery, jet planes) are assumed to be all that matter when calculating the strength of potential belligerents. As a result, international efforts to reduce global weapons stockpiles and to curb the trade in arms have been focused almost exclusively on major weapons systems. At no point since World War II have international policymakers met to consider curbs on trade in light weapons, or to restrict their production.

Recently, world leaders have begun to take a fresh interest in small arms and light weapons. Because of the global upsurge in ethnic and sectarian conflict, policymakers have become more attuned to the role played by such arms in sparking and sustaining low-level warfare, and have begun to consider new constraints on trade in these munitions. "I wish to concentrate on what might be called 'micro-disarmament,'" United Nations Secretary General Boutros Boutros-Ghali declared in January 1995. By that, he explained, "I mean practical disarmament in the context of the conflicts the United Nations is *actually dealing with*, and of the weapons, most of them

light weapons, that are actually killing people in the hundreds of thousands" (emphasis added).

This focus on the conflicts the United Nations is "actually dealing with" represents a major shift in global priorities. During the cold war, most world leaders were understandably preoccupied with the potential threat of nuclear war or an East-West conflict in Europe. Today policymakers are more concerned about the immediate threat of ethnic and sectarian warfare. While such violence does not threaten world security in the same catastrophic manner as nuclear conflict or another major war in Europe, it could, if left unchecked, introduce severe instabilities into the international system.

This inevitably leads, as suggested by Boutros-Ghali, to a concern with small arms, land mines, and other light munitions; these are the weapons, he notes, that "are probably responsible for most of the deaths in current conflicts." This is true, for instance, of the conflicts in Afghanistan, Algeria, Angola, Bosnia, Burma, Burundi, Cambodia, Kashmir, Liberia, Rwanda, Somalia, Sri Lanka, Sudan, Tajikistan, and Zaire. Although heavy weapons sometimes play a role, most of the day-to-day fighting is performed by irregular forces armed only with rifles, grenades, machine guns, light mortars, and other "man-portable" munitions.

SMALL ARMS, GLOBAL PROBLEMS

The centrality of light weapons in contemporary warfare is especially evident in the conflicts in Liberia and Somalia. In Liberia, rival bands of guerrillas—armed, for the most part, with AK-47 assault rifles—have been fighting among themselves for

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Light Weapons in Worldwide Circulation

ASSAULT RIFLES:

- Russian/Soviet AK-47 and its successors
- U.S. M-16
- German G3
- Belgian FAL
- Chinese Type 56 (a copy of the AK-47)
- Israeli Galil (also a copy of the AK-47)

MACHINE GUNS:

- U.S. M-2 and M-60
- Russian/Soviet RPK and DShK
- German MG3
- Belgian MAG
- Chinese Type 67

LIGHT ANTITANK WEAPONS:

- U.S. M-20 and M-72 rocket launchers
- U.S. Dragon and TOW antitank missiles
- Russian/Soviet RPG-2 and RPG-7 rocket-propelled grenades (and Chinese variants, Types 56 and 69)
- French-German MILAN antitank missiles

LIGHT MORTARS:

- Produced by many countries in a variety of calibers, including 60 mm, 81 mm, 107 mm, and 120 mm.

ANTIPERSONNEL LAND MINES:

- U.S. M-18A1 "Claymore"
- Russian/Soviet PMN/PMN-2 & POMZ-2
- Belgian PRB-409
- Italian VS-50 and VS-69
- Chinese Types 69 and 72

SHOULDER-FIRED ANTI-AIRCRAFT MISSILES:

- U.S. Stinger
- Russian/Soviet SAM-7
- British Blowpipe
- Swedish RBS-70

control of the country, bringing commerce to a standstill and driving an estimated 2.3 million people from their homes and villages. In Somalia, lightly armed militias have been similarly engaged, ravaging the major cities, paralyzing rural agriculture, and at one point pushing millions to the brink of starvation. In both countries, UN-sponsored peacekeeping missions have proved unable to stop the fighting or disarm the major factions.

The widespread use of antipersonnel land mines (small explosive devices that detonate when

stepped on or driven over) is a common feature of many of these conflicts. These munitions, which can cost as little as \$10 apiece, are planted in roads, markets, pastures, and fields to hinder agriculture and otherwise disrupt normal life. An estimated 85 million to 110 million uncleared mines are thought to remain in the soil of some 60 nations, with the largest concentrations in Afghanistan, Angola, Cambodia, and the former Yugoslavia. Each year some 25,000 civilians are killed, wounded, or maimed by land mines, and many more are driven from their homes and fields.

There are many reasons why small arms, mines, and other light weapons figure so prominently in contemporary conflicts. The belligerents involved tend to be insurgents, ethnic separatists, brigands, and local warlords with modest resources and limited access to the international arms market. While usually able to obtain a variety of light weapons from black-market sources or through theft from government arsenals, they can rarely afford or gain access to major weapons systems. Furthermore, such forces are usually composed of ill-trained volunteers who can be equipped with simple infantry weapons but who lack the expertise to operate and maintain heavier and more sophisticated equipment.

Logistical considerations also mitigate against the acquisition of heavy weapons. Lacking access to major ports or airfields and operating largely in secrecy, these forces must rely on clandestine and often unreliable methods of supply that usually entail the use of small boats, pack animals, civilian vehicles, and light planes. These methods are suitable for delivering small arms and ammunition, but not heavy weapons. Tanks, planes, and other major weapons also require large quantities of fuel, which is not easily transported by such rudimentary methods.

The character of ethnic and sectarian warfare further reinforces the predominance of light weapons. The usual objective of armed combat between established states is the defeat and destruction of an adversary's military forces; the goal of ethnic warfare, however, is not so much victory on the battlefield as it is the slaughter or the intimidation of members of another group and their forced abandonment of homes and villages ("ethnic cleansing"). In many cases a key objective is to exact retribution from the other group for past crimes and atrocities, a task best achieved through close-up violence that typically calls for the use of handheld weapons: guns, grenades, and machetes.

While the weapons employed in these clashes are relatively light and unsophisticated, their use can

result in human carnage of horrendous proportions. The 1994 upheaval in Rwanda resulted in the deaths of as many as 1 million people and forced millions more to flee their homeland. Similarly, the fighting in Bosnia is believed to have taken the lives of 200,000 people and has produced millions of refugees.

Although the availability of arms is not in itself a cause of war, the fact that likely belligerents in internal conflicts are able to procure significant supplies of light weapons has certainly contributed to the duration and intensity of these contests. Before the outbreak of violence in Rwanda, for example, the Hutu-dominated government spent millions of dollars on rifles, grenades, machine guns, and machetes that were distributed to the army and militia forces later implicated in the systematic slaughter of Tutsi civilians. In Afghanistan, the fact that the various factions were provided with so many weapons by the two superpowers during the cold war has meant that bloody internecine warfare could continue long after Moscow and Washington discontinued their supply operations. The ready availability of light weapons has also contributed to the persistence of violence in Angola, Kashmir, Liberia, Sri Lanka, and Sudan.

The widespread diffusion of light weapons in conflict areas has also posed a significant hazard to UN peacekeeping forces sent to police cease-fires or deliver humanitarian aid. Even when the leaders of major factions have agreed to the introduction of peacekeepers, local warlords and militia chieftains have continued to fight to control their territory. Fighting persisted in Somalia long after American and Pakistani UN peacekeepers arrived in 1992, leading to periodic clashes with UN forces and, following a particularly harrowing firefight in October 1993, to the withdrawal of American forces. Skirmishes like these were also a conspicuous feature of the combat environment in Bosnia before the signing of the Dayton peace accords, and remain a major worry for the NATO forces stationed there today.

¹Three basic sources constitute a provisional database on the topic: Jeffrey Boutwell, Michael T. Klare, and Laura W. Reed, eds., *Lethal Commerce: The Global Trade in Small Arms and Light Weapons* (Cambridge, Mass.: American Academy of Arts and Sciences, 1995); Michael Klare and David Andersen, *A Scourge of Guns: The Diffusion of Small Arms and Light Weapons in Latin America* (Washington, D.C.: Federation of American Scientists, 1996); and Jasjit Singh, ed., *Light Weapons and International Security* (New Delhi: Indian Pugwash Society and British-American Security Information Council, 1995).

Even when formal hostilities have ceased, the diffusion of light weapons poses a continuing threat to international security. In those war-torn areas where jobs are few and the economy is in ruins, many demobilized soldiers have turned to crime to survive, often using the weapons they acquired during wartime for criminal purposes or selling them to combatants in other countries. During the 1980s, South African authorities provided thousands of guns to antigovernment guerrillas in Angola and Mozambique; these same guns, which are no longer needed for insurgent operations, are now being smuggled back into South Africa by their former owners and sold to criminal gangs. Some of the guns provided by the United States to the Nicaraguan contras have reportedly been sold to drug syndicates in Colombia.

MAIMING PROGRESS

It is no longer possible to ignore the role of small arms and light weapons in sustaining international conflict. Although efforts to address this problem are at an early stage, policymakers have begun to consider the imposition of new international constraints on light weapons trafficking. The UN, for example, has established a special commission—the Panel of Governmental Experts on Small Arms—to look into the problem, while representatives of the major industrial powers have met under the auspices of the Wassenaar Arrangement (a group set up in 1996 to devise new international controls on the spread of dangerous military technologies) to consider similar efforts. Despite growing interest, movement toward the adoption of new controls is likely to proceed slowly because of the many obstacles that must be overcome. (Only in one area—the establishment of an international ban on the production and use of antipersonnel land mines—is rapid progress possible.)

One of the greatest obstacles to progress is the lack of detailed information on the international trade in small arms and light weapons. Although various organizations, including the United States Arms Control and Disarmament Agency (ACDA) and the Stockholm International Peace Research Institute (SIPRI) have long compiled data on transfers of major weapons systems, no organization currently provides such information on light weapons. Those who want to study this topic must begin by producing new reservoirs of data on the basis of fragmentary and anecdotal evidence. Fortunately, this process is now well under way, and so it is possible to develop a rough portrait of the light weapons traffic.¹

SUPPLY AND DEMAND

There is no precise definition of light weapons. In general, they can be characterized as conventional weapons that can be carried by an individual soldier or by a light vehicle operating on back-country roads. This category includes pistols and revolvers, rifles, hand grenades, machine guns, light mortars, shoulder-fired antitank and anti-aircraft missiles, and antipersonnel land mines. Anything heavier is excluded: tanks, heavy artillery, planes, ships, and large missiles, along with weapons of mass destruction.

Small arms and light weapons of the types shown in the table on page 174 can be acquired in several ways. All the major industrial powers manufacture light weapons of various types, and tend to rely on domestic production for their basic military needs. Another group of countries, including some in the third world, has undertaken the licensed manufacture of weapons originally developed by the major arms-producing states. The Belgian FAL assault rifle has been manufactured in Argentina, Australia, Austria, Brazil, Canada, India, Israel, Mexico, South Africa, and Venezuela, while the Russian/Soviet AK-47 (and its variants) has been manufactured in China, the former East Germany, Egypt, Finland, Hungary, Iraq, North Korea, Poland, Romania, and Yugoslavia. All told, about 40 countries manufacture at least some light weapons in their own factories. All other nations, and those countries that cannot satisfy all of their military requirements through domestic production, must rely on the military aid programs of the major powers or the commercial arms market.

Historically, the military aid programs of the United States and the Soviet Union were an important source of light weapons for developing nations. In addition to the major weapons supplied by the superpowers to their favored allies, both Moscow and Washington also provided vast quantities of small arms, grenades, machine guns, and other light weapons. Today, direct giveaways of light weapons are relatively rare (although the United States still supplies some surplus arms to some allies), so most developing nations must supply their needs through direct purchases on the global arms market.

Unfortunately, there are no published statistics on the annual trade in light weapons. However, the ACDA has estimated that approximately 13 percent of all international arms transfers (when measured in dollars) is comprised of small arms and ammunition. Applying this percentage to ACDA figures on the value of total world arms transfers in 1993 and

1994 would put global small arms exports at approximately \$3.6 billion and \$2.9 billion, respectively (in current dollars). Adding machine guns, light artillery, and antitank weapons to the small arms category would probably double these figures to some \$6 billion per year, which is about one-fourth the total value of global arms transfers.

Further data on the sale of small arms and light weapons through commercial channels are simply not available. Most states do not disclose such information, and the UN Register of Conventional Arms (an annual listing of member states' arms imports and exports) covers major weapons only. However, some indication of the scope of this trade can be obtained from the information in *Jane's Infantry Weapons* on the military inventories of individual states. The FAL assault rifle is found in the inventories of 53 third world states; the Israeli Uzi submachine gun is found in 39 such states; the German G3 rifle in 43 states; and the Belgian MAG machine gun in 54 states.

For established nation-states (except those subject to UN arms embargoes), the commercial arms trade provides an ample and reliable source of small arms and light weapons. For nonstate actors, however, the global arms market is usually closed off. Most countries provide arms only to other governments, or to private agencies that employ or distribute arms with the recipient government's approval. (Such approval is sometimes given to private security firms that seek to import firearms for their own use, or to gun stores that sell imported weapons to individual citizens for hunting or self-defense.) All other groups, including insurgents, brigands, and ethnic militias, must rely on extralegal sources for their arms and ammunition.

THE OTHER ARMS MARKETS

Nonstate entities that want weapons for operations against the military forces of the state or against rival organizations can obtain arms in three ways: through theft from government stockpiles; through purchases on the international black market; and through ties to government agencies or expatriate communities in other countries.

Theft is an important source of arms for insurgents and ethnic militias in most countries, especially in the early stages of conflict. The fledgling armies of Croatia and Slovenia were largely equipped with weapons that had been "liberated" from Yugoslav government arsenals. Weapons seized from dead or captured soldiers also figure prominently in the arms inventories of many insur-

gent forces. Thus the mujahideen of Afghanistan relied largely on captured Soviet weapons until they began receiving arms in large quantities from outside sources. Many of the guerrilla groups in Latin America have long operated in a similar fashion.

For those insurgent and militia groups with access to hard currency or negotiable commodities (such as diamonds, drugs, and ivory), a large variety of light weapons can be procured on the international black market. This market is composed of private dealers who acquire weapons from corrupt military officials or surplus government stockpiles and ship them through circuitous routes—usually passing through a number of transit points known for their lax customs controls—to obscure ports or airstrips where they can be surreptitiously delivered to the insurgents' representatives. Transactions of this sort have become a prominent feature of the global arms traffic, supplying belligerents around the world. The various factions in Bosnia, for example, reportedly obtained billions of dollars in arms through such channels between 1993 and 1995. Many other groups, including the drug cartels in Colombia and the guerrilla groups in Liberia, have also obtained arms in this fashion.

Finally, insurgents and ethnic militias can turn to sympathetic government officials or expatriate communities in other countries for weapons (or for the funds to procure them from black-market suppliers). During the cold war, both the United States and the Soviet Union—usually operating through intelligence agencies like the CIA and the KGB—supplied weapons to insurgent groups in countries ruled by governments allied with the opposing superpower. At the onset of the 1975 war in Angola, for example, the CIA provided anticommunist insurgents with 20,900 rifles, 41,900 anti-tank rockets, and 622 mortars; later, during the Reagan administration, the United States supplied even larger quantities of arms to the contras in Nicaragua and the mujahideen in Afghanistan. The KGB also supplied insurgent groups with arms of these types, often routing them through friendly countries such as Cuba and Vietnam.

Superpower intervention has largely ceased with the end of the cold war, but other nations are thought to be engaged in similar activities. The Inter-Services Intelligence (ISI) agency of Pakistan

is believed to be aiding in the covert delivery of arms to antigovernment insurgents in Kashmir. Likewise, the government of Iran has been accused of supplying arms to Kurdish separatists in Turkey, while Burkina Faso has been charged with aiding some of the guerrilla factions in Liberia. Expatriate groups have also been known to supply arms to associated groups in their country of origin. Americans of Irish descent have smuggled arms to the Irish Republican Army in Northern Ireland, while Tamil expatriates in Canada, Europe, and India are thought to be sending arms (or the funds to procure them) to the Tamil Tigers in Sri Lanka.

A DUAL STRATEGY FOR ARMS CONTROL

What are the implications of all this for the development of new international restraints on light weapons trafficking? We are dealing with two separate, if related, phenomena: the overt, legal transfer of arms to states and state-sanctioned agencies, and the largely covert, illicit transfer of arms to insurgents, ethnic militias, and other nonstate entities. While there is obviously some overlap between the two systems of trade, it is probably not feasible to deal with both through a single set of controls.

Any effort to control the light weapons trade between established states (or their constituent parts) will run into the problem that most government leaders believe the acquisition of such weaponry is essential to

the preservation of their sovereignty and therefore sanctioned by the United Nations charter. Many states are also engaged in the sale of light weapons and would resist any new constraints on their commercial activities. It is unlikely, therefore, that the world community will adopt anything resembling an outright ban on light weapons exports or even a significant reduction in such transfers.

This does not mean that progress is impossible. It should be possible to insist on some degree of international transparency in this field. At present, governments are under no obligation to make available information on their imports and exports of light weapons. By contrast, most states have agreed to supply such data on major weapons systems, for release through the UN Register of Conventional Arms. Although compiling data on transfers of small arms and light weapons would undoubtedly prove more difficult than keeping track of heavy

weapons (because small arms are normally transferred far more frequently, and with less government oversight, than heavy weapons), there is no technical reason why the UN register could not be extended over time to include a wider range of systems. Including light weapons in the register would enable the world community to detect any unusual or provocative activity in this area (for example, significant purchases of arms and ammunition by a government that is supposedly downsizing its military establishment in accordance with a UN-brokered peace agreement) and to respond appropriately.

The major arms suppliers could also be required to abide by certain specified human rights considerations when considering the transfer of small arms and light weapons to governments involved in violent internal conflicts. Such sales could be prohibited in the case of governments that have suspended the democratic process and employed brutal force against unarmed civilians. An obvious candidate for such action is Burma, whose military leadership has usurped national power, jailed pro-democracy activists, and fought an unrelenting military campaign against autonomy-seeking minority groups. Human rights considerations have already figured in a number of UN arms embargoes—such as that imposed on the apartheid regime in South Africa—and so it should be possible to develop comprehensive restrictions of this type.

Finally, the world community could adopt restrictions or a prohibition on the transfer of certain types of weapons that are deemed to be especially cruel or barbaric in their effects. The first target should be the trade in antipersonnel land mines. President Bill Clinton called for a worldwide ban on the production, transfer, and use of such munitions in May 1996. Many other leaders have promised to support such a measure, but more effort is needed to persuade holdout states to agree. In addition to land mines, a ban could be imposed on bullets that tumble in flight or otherwise reproduce the effects of dum-dum bullets (a type of soft-nosed projectile that expands on impact and produces severe damage to the human body). Bullets of this type were outlawed by the Hague Convention of 1899, but have reappeared in other forms.

STOPPING BLACK-MARKET TRAFFIC

An entirely different approach will be needed to control the black-market traffic in arms. Since such trafficking violates, by definition, national and

international norms regarding arms transfers, there is no point in trying to persuade the suppliers and recipients involved to abide by new international restraints on the munitions trade. Instead, governments should be asked to tighten their own internal controls on arms trafficking and to cooperate with other states in identifying, monitoring, and suppressing illegal gun traffickers.

As a first step, all the nations in a particular region—such as Europe or the Western Hemisphere—should agree to uniform export restrictions and establish electronic connections between their respective customs agencies to permit the instantaneous exchange of data on suspect arms transactions. These measures should prohibit the export of arms to any agency or firm not subject to government oversight in the recipient nation, and the use of transshipment points in third countries that do not adhere to the uniform standards. At the same time, the law enforcement agencies of these countries should cooperate in tracking down and prosecuting dealers found to have engaged in illicit arms transfers. Eventually these measures could be extended on a worldwide basis, making it much more difficult for would-be traffickers to circumvent government controls.

It is unrealistic, of course, to assume that these measures will prevent all unwanted and illicit arms trafficking—there are simply too many channels for determined suppliers to employ. Nor should airtight control be the goal of international action. Rather, the goal should be to so constrict the flow of weapons that potential belligerents (including nonstate actors) are discouraged from achieving their objectives through force of arms and seek instead a negotiated settlement. Such controls should also be designed to reduce the death and displacement of civilians trapped in conflict areas, and to impede the activities of terrorist and criminal organizations.

Obviously, it will not be possible to make progress so long as policymakers view the trade in small arms and light weapons as a relatively insignificant problem. Educating world leaders about the dangerous consequences of this trade in an era of intensifying ethnic and sectarian conflict is a major arms control priority. Once these consequences are widely appreciated, it should be possible for the world community to devise the necessary controls and make substantial progress in curbing this trade. ■

"Did the West defeat Soviet communism only to make the world safe for American and European weapons? Is this the meaning of the end of the cold war? Or does the removal of a potent adversary also imply the need to change policy, to delimit commerce in modern weapons and military technology in the interest of world peace and stability?"

The Political Economy of Conventional Arms Proliferation

WILLIAM W. KELLER

At the end of the cold war, many critics of the arms trade were elated. The dollar volume of international arms sales fell by half and the Russian bear, if not slain, seemed to have gone into hibernation. In their euphoria the critics envisioned a gigantic peace dividend that could be used to ameliorate social evils.

While the tempo of nonproliferation efforts escalated at the ends of the arms spectrum—nuclear weapons and small arms—little attention was paid to anything in between. Even after the Persian Gulf War, which was prosecuted with foreign weapons, the arms trade was pushed to the bottom of the United States foreign policy agenda. The domestic issue of jobs and concerns about the structural integrity of the so-called defense industrial base took center stage instead.

This shift from geopolitical to domestic employment concerns was due in no small part to the skill of the arms lobby in Washington, which considered the end of the cold war a threat to arms production. Foreign military sales were seen as a way to compensate for some of the lost revenues. The strategy was to rally unions, arms exporters, and the government around the issue of jobs. A new lobbying coalition composed of six arms companies and six unions, U.S. Jobs Now, distributed its brochures and videotapes throughout Washington, promising work for Americans—work tied to massive exports of weapons to the Persian Gulf and East Asia.

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As the U.S. Jobs Now perspective worked its way into official United States arms export policy in 1995, most of those who opposed arms sales during the cold war became less alarmed and less critical. They did so as if the military-industrial infrastructure and political antipathies built up over four decades of superpower confrontation had simply vanished. In 1995, when 33 nations established the Wassenaar Arrangement to restrain the arms trade, they stood idly on the sidelines: it was as if a historic accord had not been executed and international institutions for limiting the arms trade were commonplace.

The Wassenaar Arrangement is the only important multilateral agreement that addresses the conventional arms trade and high-technology items with military applications. It offers the hope of becoming the missing link in the global nonproliferation effort. But it has received scant attention in the mainstream press and has been greeted with neglect, and even cynicism, by the arms control community.

Why not Wassenaar? What level of conflagration will be required before effective controls are instituted? In the last major war in the Persian Gulf, conventional weapons were effectively used as weapons of mass destruction, both in terms of loss of life and damage to physical infrastructure. If we have learned anything in the past 50 years, it is that nuclear weapons are controlled. Tanks, artillery, combat aircraft, warships, missiles, cluster munitions, and other conventional weapons are not.

Over the last 50 years, there have been 161 wars with an estimated loss of 24,500,000 lives. For this reason alone, the singled-minded focus of the nonproliferation community on weapons of mass

destruction is misplaced. It has served, in part, to mask the risks and consequences associated with the spread of modern conventional arms. These weapons are routinely exported by many countries to enhance the profitability of arms firms; whether they endanger international security or not has become a secondary consideration. At the end of the twentieth century, the political economy of the global arms trade does not bode well for international peace and security.

MIDDLE EAST MACHINATIONS

The 1990 Iraqi invasion of Kuwait tarnished the image of the "new world order." It also impeded efforts to add coherence to the arms export and military industrial policies of the United States and Europe. Perhaps because the United States-led coalition emerged victorious, with so few casualties and with such apparent ease, the contradictions of the 1991 Gulf War failed to register on policymakers in the West. Global weapons production and the transfer of military technology continued to expand, and United States arms exports flourished. The opportunity to examine critically and redirect international relations was delayed and probably lost. Because the stakes were so high, a careful examination of how this came to pass is merited.

With the dramatic destruction of Iraqi military power in the Gulf War, the United States was in a position to exert profound influence on conventional weapons proliferation. It could have chosen to press its advantage—to increase arms exports to a range of existing markets, especially in the Middle East and East Asia. As the world's leading arms exporter, the United States could also have seized the moment and convinced the other major suppliers to reduce commerce in weapons and advanced military technology.

This choice pitted congressional activism in non-proliferation and conventional arms control against the ambitious arms export policies and plans of President George Bush's administration. In mid-September 1990, with United States forces deploying in Saudi Arabia but not yet engaged, the administration floated a proposal to sell approximately \$21 billion in military equipment to Saudi Arabia. Even though the administration envisioned a sale of advanced equipment in unprecedented quantities, it failed to consult with key congressional leaders. The reaction was predictably strong and sustained. Subcommittee chairman David R. Obey (R-OK) characterized the sale as "wildly large...grossly oversized."

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The Bush administration made a tactical decision to reduce the \$21 billion proposal to \$7.5 billion. In October, 11 senators denounced the sale on the Senate floor. Senator Alan Cranston (D-CA) accused the administration of misrepresenting the sale's magnitude to Congress. "The proposed \$7.5 billion sale is not to be a substitute for the big package. It is only a teaser, a forerunner of what would be the largest arms transfer in United States history." In the House, Foreign Affairs subcommittee chairman Lee H. Hamilton (R-IN) held a hearing in which he accused the administration of failing to "play this sale straight" with Congress. "Let's be frank," he added, "while this package is a very big improvement over the first proposal, much of it still has nothing to do with the current crisis in Kuwait. . . [T]he Saudis, with only 65,000 men under arms, will simply not be capable of defending themselves against a well-armed Iraq absent significant American support, no matter how gold-plated their equipment."

The months following the Gulf War saw a flurry of congressional proposals to curtail United States arms sales to the Middle East. In April 1991, five influential members of the House of Representatives wrote President Bush that "a temporary pause is necessary in order to facilitate multilateral negotiations on agreements to restrain the flow of sophisticated conventional weapons systems and other weapons technologies into this region."

It was in this context that President Bush announced in May 1991 a plan for arms control in the Middle East. It was the first major American policy statement on proliferation since the Gulf War. The president proposed a ban on weapons of mass destruction and a freeze on the acquisition, production, and testing of surface-to-surface missiles in the region. There was, of course, no possibility that Israel would agree to a ban on nuclear weapons, but restrictions on biological and chemical weapons and missiles might have been negotiable.

With respect to conventional arms, the plan called on the world's five major suppliers—the United States, the Soviet Union, China, France, and Britain—to exercise "collective self-restraint," to avoid exporting "destabilizing" weapons, and to draw up a set of guidelines for the transfer of conventional weapons to the Middle East. At the time, these five countries—which were also the five permanent members of the UN Security Council—accounted for about 90 percent of all arms exports

to the developing world and for an even larger percentage of the trade in advanced weapons.

In the press briefings and explanations that followed the announcement, the Bush administration made clear its intention to sell conventional weapons to the Middle East. Reginald Bartholomew, the undersecretary of state responsible for arms exports, explained the new policy to the Senate Foreign Relations Committee: "We do not believe that arms sales are necessarily destabilizing. Quite the contrary... We will not seek a regime that halts arms transfers... [I]t is in no way a contradiction for the United States to be simultaneously seeking an arms transfer regime with the other major suppliers and continuing to supply arms needed by peaceful states to defend themselves against aggressors."

Several days prior to a June 1991 hearing on arms transfer policy, the administration announced the sale of 20 Apache attack helicopters to the United Arab Emirates (UAE) and 8 to Bahrain. When questioned, Bartholomew responded that the sale was not destabilizing. It was, he said, "consistent with what we are trying to do—politically, in security terms, and with this arms control proposal in the area." The sale was legitimate because, in his view, it did not introduce new levels of military capability, contribute to the regional arms race, or enable the UAE to project power into neighboring states. One senator asked if this meant that Apache-type attack gunships would therefore be allowed under the proposed arms control regime. Bartholomew's response: it depends entirely on the circumstance of the sale in question. Would advanced fighter aircraft be permissible? Bartholomew: "I am not ready to say that there are no circumstances in which the transfer of advanced fighter aircraft could be stabilizing as opposed to destabilizing. It most certainly can be [stabilizing]." What could be banned by definition? Only weapons of mass destruction and ballistic missiles.

A RECKLESS POLICY

What the undersecretary knew, but would not state for the record, was that the administration's plan to control arms exports to the Middle East would not diminish the heavy flow of United States arms to that region. Instead, the Apache sale (valued at about \$682 million) was only the first on a long list of planned exports to the Persian Gulf. In the June 1991 hearing, and others that followed, the administration merely went through the motions to ensure a compliant Congress. It had already set the policy agenda. The plan was to cement cooperative

security arrangements among the smaller states of the Persian Gulf and provide the muscle to back them up. To do this, the United States would arm the Gulf—principally Saudi Arabia, Kuwait, Bahrain, Oman, and the UAE (with the usual complement of weapons for Israel and Egypt)—at unprecedented levels, and then be prepared to commit troops again if the weapons failed to deter or repel aggression from other highly armed states in the region. The role of the United States as security guarantor was critical because the administration never believed that its Persian Gulf clients, even when fully armed, could do more than slow the onslaught of a determined aggressor.

But this policy, which requires massive arms transfers to maintain or build up military power on all sides to achieve peace, even in the midst of war, is flawed. First, while any particular sale might be labeled stabilizing or destabilizing, stability is neither a fixed property nor an objective quality when applied to arms sales. It is not fixed, because the designation "stabilizing" depends on circumstances that often change in unpredictable ways. Weapons sold for defensive purposes are often deployed in offensive configurations, and they may be captured by opposing forces. Stability is also not objective, because what appears to one side to be a stabilizing sale may be interpreted by the other as an aggressive new capability, stimulating an arms race and further complicating the equation.

Second, the linkage between any particular arms sale and an overall balance of power in the Middle East is tenuous and time-limited at best. There is no single balance to be achieved in the region, but rather a series of potential conflicts, which may or may not be consummated. There is the balance between Israel and certain Arab states, which, far from being maintained at equal levels, has been constructed to give Israel a qualitative superiority; in any case, Israel's possession of a large nuclear arsenal and accurate means of delivery puts it in a class by itself. Then there is a balance between Egypt and several Arab states that must be maintained in view of the Camp David accords. There is also the balance in the Persian Gulf (which was the principal interest of the Bush administration) between the small oil-rich states and their larger, poorer, more belligerent neighbors to the north. Each of these relationships interacts with the others, making an overall balance very difficult to achieve. Amid such conditions, the Persian Gulf War can be seen—at a very fundamental level—as a correction of the military imbalance created by

profligate and irresponsible arms sales to Iraq and Iran in the 1980s. (From 1979 through 1990, Iraq imported \$83.3 billion in conventional weapons and Iran imported \$28.2 billion, for a total of \$112.5 billion in constant 1993 dollars.)

Third, the American policy of using massive arms transfers to reach a balance in the Persian Gulf was unilateral in nature, and it did not and could not anticipate or compensate for arms transferred by other nations. Increasing diversity of supply decreases the likelihood that supplier nations can somehow establish a balance of military power among recipient states. If the goal of creating such a balance is to deter war, the historical record is indeed bleak; the frequency and intensity of wars in the Middle East are *prima facie* evidence that massive arms transfers have not led to stable political relations among states in that region.

For this reason alone, a strategy to attain stability and peace through the transfer of tens of billions of dollars in advanced fighters, tanks, anti-radiation missiles, and munitions to selected states in the Persian Gulf ought to be subject to intense scrutiny. If the past is prologue, it will continue to be difficult to anticipate the actions of political leaders or even large-scale regime changes in the region. Under these circumstances, it is remarkable that the Bush administration so blithely announced the dual-track policy of seeking multilateral restraint and then ramped up arms sales to the region.

This was the first American policy on arms exports that could not be buttressed by the logic of the cold war. No Soviet Union existed to arm its surrogates on the other side of an ideological divide. Indeed, arms exports from the former Soviet republics and satellite states had dropped to historic lows. There was no geostrategic need to balance arms in the Middle East. In the emerging world order it was important to stop Saddam in Kuwait—not for ideological reasons, but to prevent him from gaining control of the region's oil reserves and thereby the ability to disrupt global commerce. In the wake of the Gulf War, the Bush administration missed the opportunity to forge a new policy on arms exports to the Middle East.

The Americans and other major suppliers failed to recognize that the international arms business, in which the United States is first among several prominent players, is creating a dangerously armed world. For decades arms imported to the Middle East have raised the stakes associated with political

instability and figured prominently in the calculations of militant religious regimes and regional strongmen. As the Islamic revolution in Iran has shown, once transferred, modern weapons can outlast the governments they were intended to support. As the French learned in Iraq, arms may also outlast the goodwill of the leaders to whom they were supplied.

THE THREAT TO INTERNATIONAL SECURITY

As politicians everywhere proclaimed a "new world order"—the end of 40 years of nuclear confrontation between East and West—a new threat emerged: sporadic militarism. To some it was embodied in the person of Saddam Hussein and the vast force he assembled to crush Kuwait and achieve his objectives in the Arab world. But Saddam did not spring full-blown from the desert sands. He was, instead, propped up by the profligate arms export policies of the advanced industrial democracies and the Soviet Union, and by the

inability of these states to contain the underlying technologies for weapons of mass destruction.

We have reached a threshold where even the most destructive and sophisticated armaments are available to an expanding range of political actors and industrial organizations. The availability of conventional arms is a direct consequence of the policies of the major arms-

producing states: they have promoted the export of sophisticated weapons and the associated production technologies to the developing world. The increasing availability of these weapons is also tied directly to the infusion of commercial technology into weapons systems, and to the so-called civil-military integration initiatives promoted by the United States Defense Department in the mid-1990s.

In this era of regional instability and ethnic conflict, we are stuck with the legacy of the cold war: not only political disintegration, but also the physical remains of destructive capabilities developed during four decades of technomilitary confrontation. Because there cannot be an end of technology, the knowledge and industrial infrastructure built up during the cold war is increasingly common, and is increasingly available to less developed nations. And it is not only military technology but the whole high-tech sector that is spinning out new materials and modes of information processing and storage, suitable both for commercial and military ends.

As national governments purchase less military equipment, arms companies are compelled to find technological synergies and economies of scale associated with multinational production for global markets. Facing overcapacity and exponential increases in the cost of developing new weapons, they seek, like other high-technology industries, to establish international networks of supply and production, and to export components and finished weapons to meet demand wherever it may exist.

Arms firms from different nations have entered into strategic alliances, joint ventures, licensed production and codevelopment activities, and many other business arrangements that transfer militarily useful technology from one nation to another. As trade in military and dual-use technologies has expanded, both among the advanced industrial states and from them to the less developed world, new centers of military industry and technology have emerged around the globe. Each new center is capable of transferring technology and selling weapons to additional countries. The primary result is the globalization of the military industry itself. A collateral effect is the gradual and collective loss of political control over potent weapons that now emanate from many parts of the world.

We have entered an era where global communications, industrial infrastructure, and multinational insertion of technology into the world economy is breaking down national and political boundaries, and with them the allegiance of corporations to nations. As the differences between military and civilian technologies diminish, so too does the distinction between public and private control. Increasingly, companies, not nations, own and manage the crown jewels of the global military-industrial enterprise.

The Persian Gulf War demonstrated that it is dangerous for the makers and sellers of arms to ignore the consequences of largely unrestrained global trade in modern weapons. In the 10 years preceding the war, the value of global arms exports totaled \$625.8 billion, of which \$488.5 billion (about 78 percent) was acquired by developing nations. In simple terms, the NATO and Warsaw Pact countries—responsible for approximately 90 percent of global weapons exports—armed the developing world. After the cold war, the West continued to make massive sales of weapons to developing countries, even though it is undeniable that the presence of vast and increasingly sophisticated arse-

nals among likely belligerents raises the stakes associated with regional instability and conflict.

In 1995 the United States issued an arms transfer policy that paid lip service to the idea of restraint, but for the first time also explicitly supported arms exports as a way to shore up United States military-industrial interests. A principal goal of Presidential Directive 41 of February 1995 was, according to the Clinton administration, “to enhance the ability of the U.S. defense industrial base to meet U.S. defense requirements. . . at lower costs.” Moreover, United States officials were instructed to consider “the impact [of the sale] on U.S. industry and the defense industrial base” as a general criterion for decision making on United States arms exports. The arms industry’s political clout was understandable: by the mid-1990s, the United States already accounted for 50 to 60 percent of global arms exports, and was expected to maintain or surpass that level by the year 2000.

A policy that promotes extensive commerce in military technology and advanced weapons treats the arms industry as though it is merely another sector of the international economy. It says that economic—not political—forces should determine the allocation of potent weapons, and that foreign military sales should be used to bolster the military production base at home. This logic encourages the dissemination of dangerous conventional weapons of all kinds. Did the West defeat Soviet communism only to make the world safe for American and European weapons? Is this the meaning of the end of the cold war? Or does the removal of a potent adversary also imply the need to change policy, to delimit commerce in modern weapons and military technology in the interest of world peace and stability?

If present policies and trends persist, the trade in arms and military technology will produce a world in which the power and diffusion of modern weapons continuously undermine relations among states, disrupting alliances and increasing uncertainty and risk in international relations. By exporting excessive amounts of potent weapons and the associated production and delivery technology, the advanced industrial states continue to build up the ability of potentially renegade states or terrorist organizations to make trouble, to threaten the use of force or attack weaker neighbors. If modern weaponry continues to proliferate at present rates, the Persian Gulf War and the war in Bosnia—which initiated the post-cold war order—may come to define it. ■

"Decisions made in Washington in the coming years will determine whether the revolution in military affairs stokes future arms races and proliferation problems. . . So far the American approach, while a logical response to vexing strategic problems, has not been shaped by concern for long-term political implications."

Racing Toward the Future: The Revolution in Military Affairs

STEVEN METZ

The Persian Gulf War may have signaled a historic change in the nature of armed conflict. By most indicators the Iraqi military that occupied Kuwait was proficient and well equipped with modern weaponry, especially tanks, artillery, and air defense systems. Battle-tested in a long war with Iran, it should have been a fearsome enemy for the United States-led coalition. Pundits and political leaders expected a bloody struggle. But once the war began, Saddam Hussein's forces were brushed aside with stunning suddenness and minimal human cost to the United States and its allies, leaving the world to ponder the war's meaning.

Initially, American military leaders saw Desert Storm as the payoff for years of accumulated improvement in training, personnel quality, doctrine, leadership, and equipment. Some analysts unearthed deeper lessons. Rather than attributing the outcome to evolutionary advancements in the United States military, they saw Desert Storm as the prologue to a fundamental transformation in the nature of warfare—a “revolution in military affairs,” or RMA. This idea had such immense strategic and political implications that American military leaders, defense policymakers, and strategic analysts soon adopted it, changing the RMA concept from a theoretical construct to a blueprint for the armed forces of the twenty-first century.

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¹Michael J. Mazarr, et al., *The Military Technical Revolution: A Structural Framework* (Washington, D.C.: Center for Strategic and International Studies, March 1993).

Today the RMA has become the basis of most long-term thinking in the Defense Department and, increasingly, for the militaries of other advanced states. But the full implication of this is not yet clear; many dimensions of the RMA await analysis. For example, little thought has been given to how the RMA might affect arms races and weapons proliferation—a serious oversight. If armed conflict is undergoing historic and significant change, “traditional” arms races will persist into the next century even as new and very different ones take shape. The more these new problems are anticipated, the easier they will be to deal with. To assess the proliferation and arms control issues that will challenge world leaders 10 years from now requires tracing the evolution of thinking on the RMA and its effect on military strategy in the United States and around the world.

THE EVOLUTION OF AN IDEA

The concept of military revolutions grew from Soviet writing of the 1970s and 1980s, particularly a series of papers by Marshal Nikolai Ogarkov. When American defense analysts initially considered this idea, they focused on the technological dimension. One of the first major study groups in the United States labeled its final report *The Military Technical Revolution*.¹ But it quickly became clear that this was an overly narrow approach that understated the importance of concepts and organizations. The idea of a “military-technical revolution” soon evolved into the more holistic concept of a revolution in military affairs.

There is now a loose consensus among scholars, policymakers, and military strategists on the most salient aspects of RMAs. In simple terms, an RMA is a rapid and radical increase in the effectiveness of

military units that alters the nature of warfare and changes the strategic environment. RMAs result from mutually supportive changes in technology, concepts, and organizations; technological advancement alone does not make an RMA. Analysts also agree that RMAs are, by definition, strategically significant. States that understand and exploit them accrue geopolitical benefits; those that do not slide into military weakness.

Even given this simple conceptual base, writers differ on when RMAs have occurred in the past. Ironically, there is greater agreement on the nature of the current RMA. Scholars, military strategists, and defense policymakers acknowledge that what drives it is a vast improvement in the quality and quantity of information made available to military commanders by improvements in computers and other devices for collecting, analyzing, storing, and transmitting data. The United States Army, for instance, talks of "digitized" battle in which a commander would use an array of sensors and data-fusion technologies to obtain a near-perfect picture of the battlefield that would provide the location and status of all friendly and most enemy units, thus dispelling what has been called the "fog of war." Such a development would certainly represent a sea change in the nature of armed conflict. The presence (or absence) of accurate information has long shaped the conduct of warfare. If the RMA does lift the "fog of war," the results will be stunning, giving those armed forces that master the changes immense advantages.

The increasing quality and quantity of military information will have a number of corollary effects. One is an alteration of the traditional relationship between operational complexity and effective control. Accurate, real-time information and advanced, computer-based training and simulation models will allow more complex military operations than in the past. Simultaneous operations across one or more military theaters might soon be possible. At the same time, the relationship between accuracy and distance in the application of military force might change as extremely precise, standoff strikes become the method preferred by advanced militaries. The RMA could relegate the close-quarters clash of troops to history.

The RMA might change military strategy as well. Futurists Alvin and Heidi Toffler have argued that information is becoming the basis of economic

strength, especially in what they call "Third Wave" states. During the "First Wave" of human development, production was primarily agricultural, so military strategies were designed to seize and hold territory or steal portable wealth. During the "Second Wave" industrial production dominated, which meant that war was often a struggle of attrition where belligerents wore down their enemies' capacity to feed, clothe, and equip armies. Following this logic, "Third Wave" warfare will seek to erode or destroy the enemy's means of collecting, processing, storing, and disseminating information.² Instead of using explosives to kill and destroy, the warrior of the future might fight with a laptop computer from a motel room, attacking digital targets with strikes launched through fiber-optic webs in order to damage or alter enemy information infrastructure and data resources. The opening words of the next global war might be "Log-on successful" rather than "Tora, Tora, Tora." From the perspective of arms control, it is a chilling thought that something as uncontrollable as a few thousand lines of computer code could become a dangerous weapon.

THE AMERICAN ORTHODOXY

No organization undertakes a revolution without a pressing incentive. This certainly holds for the United States military. The Defense Department is pursuing the RMA in response to two important post–cold war strategic trends. One is a decline in the American military force structure and budget without a concomitant decline in responsibilities and missions, which has generated a growing mismatch between means and ends. The other is what military and civilian leaders see as the American public's limited tolerance for the human toll of armed conflict. These two issues form the core dilemma of current United States national security strategy and drive the quest for the RMA.

During the wide-ranging reassessment of national security strategy in the early 1990s, people like Andrew Marshall, director of the Defense Department's Office of Net Assessment, and Admiral William A. Owens, former vice chairman of the Joint Chiefs of Staff, concluded that an American military built along the principles of the RMA could be smaller yet more powerful than the present one. To use jargon that has become a mantra within the military, the goal was to "leverage technology" to solve strategic dilemmas. By the mid-1990s the RMA had moved from the realm of theorists and military historians to the world of force structure planning and programming.

²Alvin and Heidi Toffler, *War and Anti-War: Survival at the Dawn of the 21st Century* (Boston: Little, Brown, 1993).

The RMA quickly entered the mainstream thinking of the American armed forces. Courses appeared at war colleges and staff schools, RMA-related articles became common in military journals, and military think tanks began to produce studies, reports, exercises, and war games. Institutions designed to develop, test, and refine RMA-related concepts emerged throughout the Department of Defense. Government labs explored technologies to make the RMA possible, especially in areas such as information gathering, assessment, and dissemination, nonlethal weapons, robotics, unmanned military systems, new materials, and new energy sources.

Other nations quickly joined the bandwagon. The Australian military hosted one of the first major RMA conferences outside the United States in Canberra, Australia, in February 1996. At the National Institute for Defense Studies in Tokyo, a series of RMA seminars attracted the attention of senior policymakers. The French have also begun exploration of the RMA.

Still, the United States military is clearly the leader in RMA thinking and continues to define the "orthodoxy." In 1996 this was codified in Chairman of the Joint Chiefs of Staff General John Shalikashvili's Joint Vision 2010, which is the best distillation of official United States thinking on the RMA and the future security environment. Joint Vision 2010 projects no revolutionary change in the global strategic environment over the next decade. The primary task of American armed forces, Shalikashvili contends, will continue to be to deter conflict and, if that fails, to fight and win the nation's wars. Power projection enabled by an overseas presence will remain the fundamental strategic concept, and the military forces of other nations still the primary foe.

Joint Vision 2010 does, however, anticipate great strides in the adoption of new technology, concepts, and organizations. It predicts that technology will allow even more emphasis on long-range precision strikes. New weapons based on directed energy will appear. Advances in low observable ("stealth") technologies will augment the ability to mask friendly forces from enemies. And improvements in information and systems integration technologies will provide decision makers with fast and accurate information. In combination, these technologies will allow increased stealth, mobility, and dispersion, and a higher tempo of operations, all under the shield of information superiority.

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Four operational concepts form the heart of Joint Vision 2010. The first, *dominant maneuver*, would allow overwhelming force against an opponent by conducting synchronized operations from dispersed locations rather than from a few large bases or camps. The second key concept is *precision engagement*. This would be based on a "system of systems" that would allow United States forces to locate a target, attack it with great accuracy, assess the effectiveness of the attack, and strike again when necessary. In many cases, the strike systems themselves would be "stealthy." The third operational concept, *full-dimension protection*, entails protecting friendly forces from enemy information warfare, missile attacks, and other threats. The final concept is *focused logistics*, which fuses information, logistics, and transportation technology to deliver tailored logistics packages at all levels of military operations. If attained, these four concepts would give American forces full spectrum dominance over anticipated enemies in the first two decades of the twenty-first century, assuming such enemies cannot develop effective responses to American advances.

While largely excluded from Joint Vision 2010, there is one other important component of current American thinking on the RMA: a desire to use technology to make warfare "cleaner" by reducing the casualties and collateral damage normally associated with combat operations. To a great extent, this is a response to the global communications explosion that has expanded the audience for armed conflict beyond the participants. To be politically acceptable, military operations must minimize casualties. Precision conventional strikes are part of this, but even more radical change may be possible through explicitly nonlethal weapons such as acoustic, laser, and high-power microwaves; nonnuclear electromagnetic pulses; high-power jamming; obscurants, foams, glues, and slicks; supercaustics that erode enemy equipment; magnetohydrodynamics; information warfare; and soldier protection. The American military's interest in nonlethality has increased dramatically, but the full implications—especially for human rights and ethical limits on the use of force—await exploration.

STOKING A NEW ARMS RACE?

The military described in Joint Vision 2010 will be able to counter a traditional enemy relying on massed, armor-heavy formations in relatively open

terrain. But, since Desert Storm showed the futility of pitting an old-fashioned military against a cutting-edge one in maneuver warfare, future opponents are unlikely to repeat Iraq's mistakes. Indeed, the world is unlikely to cede permanent military superiority to the United States. A few advanced nations may emulate the American version of the RMA, but those with the technological capacity to do so do not have the political incentive.

Most potential enemies will not have the scientific and technological resources to emulate the United States military and will instead seek asymmetric counterweights. Like guerrilla warfare in Vietnam, these may not give American enemies the ability to win battlefield victories, but they will allow them to raise the cost of the conflict, possibly to the point of paralyzing American policymakers. One example is the "Somali strategy," in which small groups of warriors armed with relatively low-cost weapons operate among civilians in an urban environment. The United States military envisioned in Joint Vision 2010 would have more trouble with such an opponent than with an Iraq- or North Korea-style enemy. Even more ominously, potential enemies may turn to terrorism against "soft" targets in the United States, perhaps using weapons of mass destruction, in order to deter American military action. Even though terrorism may not be the preferred method of fighting, enemies of the United States may feel that its military power leaves them no alternative.

Finally, information warfare is likely to stoke an arms race of its own. Even today there is sharp competition between computer hackers and virus-writers and businesses, networks, and law-abiding individuals. As armed forces become more information- and computer-dependent, this competition may shift to the military realm. Hacking, virus-writing, and crashing data information systems—as well as defending against enemy hackers and virus writers—may become core military skills, as important as the ability to shoot. In this particular arena, the American armed services are less clearly superior to potential enemies than in traditional military functions, so the spiral of response and counter-response is likely to be intense.

MARCHING TOWARD THE FRINGE

The RMA described in Joint Vision 2010 does not represent a fundamental transformation of armed conflict; it is more "hyper-evolutionary" than revolutionary. But it is possible to use existing trends to speculate on the direction armed combat may take

beyond 2010 and imagine the problems that could emerge. For example, future armed conflict may involve little or no direct human contact. Advances in robotics and nanotechnology—the ability to manipulate and manufacture individual molecules—may soon allow the construction of tiny but "brilliant" military machines capable of complex decision making. This could turn warfare into a machine-on-machine struggle, with humans on the sidelines. Machines may become self-repairing, self-replicating, even self-improving. At some point, cyborgs—complex machines with some attributes of living organisms—may become feasible and the proliferation of militarily relevant genetic material a key issue for arms control.

Even more ominously, technology to manipulate human thoughts, perceptions, attitudes, and beliefs using electronic or chemical means might become feasible. This could entail direct "mind control," holograms, and "morphing" an individual by creating, manipulating, and transmitting a computer-generated image indistinguishable from a real one. It is easy to imagine the horror of such developments, but it is equally easy to understand how a beleaguered leader might decide that the immorality of psychotechnology is justified by a serious security threat (especially if the public has already become accustomed to such techniques through the entertainment and advertising industries). If one nation opens this Pandora's box and demonstrates substantial progress in psychotechnology, others will surely follow, unleashing another kind of arms race.

Finally, future warfare may also see changes in who fights, with the "privatization" of warfare made possible, perhaps even likely. If the current RMA allows the development of small but effective armed forces, powerful transnational mercenary corporations may arise. The same factors that led to the proliferation of mercenaries in the past—the expense of training and sustaining a military force, the sporadic need for one, and a moral disdain for the profession of arms—show signs of rebirth. In coming decades, high-tech, transnational mercenary corporations or the private armies of other transnational corporations may be able to challenge or defeat the armed forces of less advanced states.

DISTANT RUMBLINGS

Only the historians of the future will know whether a full-scale RMA was under way in the 1990s. But for those living through these times—especially policymakers who must deal with arms control and proliferation—there is little doubt that

there is at least a revolution in weaponry. This can be seen in the shifting valuation of weapons systems. In the past, valuation was based on the ratio of cost to destructiveness. Now what might be called "discernment"—accuracy and, increasingly, decision-making capacity—is equally important. To some extent, availability and usability will still structure the arms races of the early twenty-first century, but the technology-driven global dispersion of information, the advent of "brilliant" systems requiring less training, the development of highly realistic computer-based training systems, and the declining distinction between weaponry and other types of information technology will encourage proliferation and arms races. At the same time, information-based weapons systems will erode the concept of national arms industries, again complicating traditional state-centric arms control regimes.

Decisions made in Washington in the coming years will determine whether the RMA stokes future arms races and proliferation problems. Other nations are interested in the RMA, but only the United States has the money, technological prowess, and strategic incentive to embrace it. So far the American approach, while a logical response to vexing strategic problems, has not been shaped by concern for long-term political implications. Pursuit of an RMA is not the wrong policy, but pursuit of the RMA described in Joint Vision 2010 may generate unintended political and diplomatic side effects and lead to a more dangerous world rather than a more stable one.

In part, this problem is structural. Within the United States government, responsibility for military strategy and arms control policy is split. The Defense Department is charged with the former while the State Department and the Arms Control and Disarmament Agency oversee the latter. In terms of political power and influence, this is an uneven match. The architects of American military strategy are not oblivious to political and diplomatic concerns, but they must respond primarily to the nation's strategic dilemma. Their attention to the diplomatic and political impact of military strategy is minimal. (The National Security Council was designed to synchronize and integrate the disparate dimensions of United States national security strategy but has shown little inclination to shape long-term military strategy.)

Still, the American approach to the RMA could be recast so that long-term political and diplomatic

considerations would receive greater emphasis. This would require redirecting the RMA from simply improving power projection. Seeking a radical improvement in the American military while the United States faces no powerful enemy raises suspicions. To many other states, the only logical reason for the United States to augment its military power in the current security environment is to pursue hegemony. So long as United States military strategy seeks power projection, other states will develop countermeasures to American military prowess, thus sparking arms races, whether symmetric or asymmetric. While this may be an acceptable risk, American policymakers and military strategists should at least explore the possibility of a less provocative variant of the RMA.

In addition, the United States should develop a coherent strategy to defend national information assets. Information systems are daily becoming more central to national life (and thus national security), but no government agency has clear responsibility for coordinating efforts to protect them. Enemies will recognize this vulnerability and attempt to use it to counter the American military, unleashing a spiral of escalation. The United States should also publicly eschew and condemn the development of any technology designed to manipulate human thoughts, beliefs, or perceptions. However alluring this "nonlethal" technology might appear at first glance, its danger is immense. Finally, the United States should expand the time horizons of its efforts to control arms races and proliferation. This would entail crafting regimes to control forms of military technology that, although technologically feasible, are not yet fielded. It is much easier to manage the development of a new form of technology than to control one that has matured to the point that powerful organizations have a vested interest in it.

The political difficulties of altering the current trajectory of the RMA should not be underestimated. In the short term, the RMA will benefit the United States by easing or alleviating some key strategic problems. The United States military of 2010 will be smaller than the current military, but it will also be more effective. In the long term, however, the RMA will create new problems for the United States by provoking asymmetric responses and fueling arms races. The record of the United States at forgoing short-term benefits for long-term gains offers little ground for optimism. ■

THE MONTH IN REVIEW

February 1997

INTERNATIONAL

International War Crimes Tribunal for Rwanda

Feb. 26—A UN official announces that Secretary General Kofi Annan has dismissed the tribunal's chief administrator, Andronico Adede, and its deputy prosecutor; on February 12, UN Inspector General Karl Paschke issued a report on the tribunal detailing mismanagement, financial abuses, and bureaucratic infighting.

North Atlantic Treaty Organization (NATO)

Feb. 18—At a NATO meeting in Brussels, US Secretary of State Madeleine Albright proposes steep conventional weapons reductions in Central and Eastern Europe and a joint NATO-Russian peacekeeping unit as part of a plan to expand NATO eastward.

World Trade Organization (WTO)

Feb. 15—in Geneva, 69 countries endorse a telecommunications agreement that will dismantle state telephone monopolies and open telephone markets; the agreement, negotiated under WTO auspices, is to take effect January 1, 1998.

AFGHANISTAN

Feb. 24—it is reported that the Taliban, a fundamentalist Islamic group that controls most of Afghanistan, has captured the Shibar Pass in heavy fighting and retaken positions in central Afghanistan from the alliance of forces led by Ahmad Shah Masud and General Abdul Rashid Doestam.

Feb. 26—Attorney General Jaliullah Maulvi Zada says 2 French aid workers will be tried on charges that they fraternized with Afghan women at a luncheon in Kabul on February 21.

ALBANIA

Feb. 5—Police in Vlore clash with thousands of people protesting the failure of a pyramid investment scheme based in the city; the scheme is the 4th to fail or have its assets seized by the government in recent weeks; many people accuse President Sali Berisha of either profiting from the schemes or failing to warn people of their dangers.

Feb. 9—Antigovernment protesters in Vlore clash with police for the 5th straight day, leaving at least 40 protesters and 1 policeman wounded; 1 man dies, reportedly of a heart attack, although protesters say he was beaten.

Feb. 10—at least 2 people are killed and 81 injured when riot police again try to break up antigovernment protests in Vlore. Prime Minister Alexander Meksi announces a partial state of emergency.

Feb. 24—a government report reveals that the ruling Democratic Party received a \$50,000 contribution from one of the country's pyramid investment schemes before the May 1996 elections.

ALGERIA

Feb. 1—the Algerian Jihad Islamic Front claims responsibility for the January 28 assassination of Abdelhak Benhamouda, the leader of the country's largest union and a close ally of President Liamine Zeroual.

Muslim insurgents kill 31 people in Medea, 15 miles south of Blida; security officials say they believe those killed were all related to a dissident member of the Armed Islamic Group.

BOSNIA AND HERZEGOVINA

Feb. 10—Bosnian Croat police fire on some 200 Muslims visiting a cemetery in the Croat-held part of the city of Mostar; 1 person is killed and at least 21 are wounded.

Feb. 14—an American mediator, Roberts Owen, delays for 1 year a decision on who will control the disputed city of Brcko; under the 1995 Dayton peace accord the status of the city, which had been ethnically cleansed of Bosnian Muslims by the Bosnian Serb army, was to be decided by today; Owen says a decision will be made by March 15, 1998.

BULGARIA

Feb. 4—the governing Socialist Party, whose unpopular prime minister, Zhan Videnov, resigned on December 21, abandons its attempt to form a new government and agrees to hold general elections by April 20.

CHINA

Feb. 5—the government says that at least 10 people were killed when 1,000 Uighur Muslims rioted today in Yining, a town in northwestern Xinjiang province.

Feb. 19—Paramount leader Deng Xiaoping, the architect of China's economic modernization program, dies; because of Deng's long illness, power has for some time been in the hands of President Jiang Zemin and Prime Minister Li Peng.

Feb. 25—Five people are killed and 60 wounded when bombs explode on 3 buses in Urumuqi, the capital of Xinjiang; no one claims responsibility for the attacks.

COLOMBIA

Feb. 4—the army announces the deployment of hundreds of additional troops to the mountains outside Bogotá where at least 19 soldiers and 10 guerrillas from the Revolutionary Armed Forces of Colombia (FARC) have died in fighting this week.

CUBA

Feb. 11—a court sentences 6 men returned to Cuba by the US Coast Guard to prison terms ranging from 8 to 20 years; the verdict violates a 1995 immigration accord in which Cuba agreed not to persecute repatriated Cubans.

ECUADOR

Feb. 5—Hundreds of thousands of workers take to the streets at the beginning of a 48-hour nationwide general strike aimed at ousting President Abdalá Bucaram; the president's economic austerity measures have been unpopular and his administration is widely considered corrupt.

Feb. 6—Congress votes to remove Bucaram from office on grounds of mental incompetence; Fabián Alarcón, the conservative congressional president, is named interim president.

Feb. 7—Bucaram rejects his impeachment as an attempted coup but eventually leaves the Presidential Palace; Bucaram's vice president, Rosalia Arteaga, claims she is the rightful successor to the presidency; before Bucaram's departure, police fire tear gas into crowds protesting outside the palace and 1 person is killed.

Feb. 9—Arteaga takes office as interim president under an agreement with congressional leaders; she will hold the post while Congress amends the constitution to establish a means by which to select a successor.

Feb. 12—Congress elects Alarcón president.

ETHIOPIA

Feb. 13—Government prosecutors indict 5,198 officials of the Marxist military junta that ruled the country from 1974 to 1991 on charges that include war crimes and genocide.

FRANCE

Feb. 2—Fifty-eight bombs explode before dawn in Corsica, injuring no one but damaging French government property; the Corsican National Liberation Front Historic Wing claims responsibility.

Feb. 9—in a runoff election, the far-right, anti-immigrant National Front wins control of the Vitrolles municipal council, ousting a Socialist mayor accused of corruption; the city is the 4th to be won by the Front, but the 1st won with an absolute majority; the party has pledged to expel 3 million immigrants if it wins national parliamentary elections in 1998.

Feb. 22—Tens of thousands of people march in Paris to protest legislation intended to restrict immigration from former French colonies in Africa and Asia.

HAITI

Feb. 24—in the northern city of St. Marc, demonstrators protesting the shooting death of a civilian by police several days ago block roads and burn a police station.

HONDURAS

Feb. 7—in Tegucigalpa, approximately 23,000 government workers take control of government buildings as part of a strike for higher wages; officials deploy riot police and threaten forcible removal and dismissal if the strike does not end within 3 days.

INDIA

Feb. 16—Members of the separatist All Tripura Tiger Force kill 28 Bengali settlers and burn homes in 3 villages in the northeastern state of Tripura; at least 52 people have been killed in ethnic violence in the past 2 weeks in Tripura, where Hindu immigration from Bangladesh has reduced the indigenous tribal population to a minority; the guerrillas have been fighting for a separate state for 17 years.

IRAQ

Feb. 23—in a joint statement, Iraq and the UN announce that Iraq has agreed to turn missile parts over to the UN; the UN has made the dismantlement of Iraqi weapons of mass destruction a condition for lifting the sanctions it imposed on Iraq after the 1990 Iraqi invasion of Kuwait.

ISRAEL

Feb. 4—a collision over north Galilee between 2 Israeli military helicopters en route to Israel's self-declared security zone in southern Lebanon kills the 73 soldiers that were on board.

Feb. 11—in partial fulfillment of the Israeli-Palestinian peace accords, Israel frees 30 Palestinian women imprisoned in Israel; the women's release, initially scheduled for September 1995, had been delayed following President Ezer Weizman's refusal to pardon 3 of the women involved in murders; the 27 remaining prisoners refused release unless the other 3 were freed as well.

Feb. 26—the government approves plans to build the first 2,500 units of a 6,500-unit Jewish housing project in East Jerusalem.

KENYA

Feb. 26—for the 4th straight day, thousands of students march in Nairobi to demand an investigation into the death of student leader and activist Solomon Muruli.

KOREA, NORTH

Feb. 7—*The New York Times* reports that late last month Taiwan's state-run power company and North Korea announced an agreement in which North Korea will dispose of up to 200,000 barrels of low-level radioactive waste from Taiwan in exchange for \$227 million in cash; the deal has sparked protests in South Korea, which fears environmental damage.

KOREA, SOUTH

Feb. 12—a Foreign Ministry official says Hwang Jang Yop, 1 of 11 secretaries of North Korea's ruling Workers Party and a leading theoretician, has sought asylum at the South Korean consulate in Beijing; Hwang is the highest-ranking North Korean official ever to defect.

Feb. 25—President Kim Young Sam apologizes to the nation for a scandal involving suspected bribes paid by the founder of Hanbo Steel, which collapsed on January 23 in the face of \$6 billion in debt; 4 of Kim's close associates have been arrested and his son accused of influence-peddling; Kim, who was elected in 1992 on an anticorruption platform, says the scandal is a result of his own "lack of virtue."

Li Han Young, a 1982 defector from North Korea shot in Seoul on February 15 by 2 gunmen suspected of being North Korean agents, dies.

LEBANON

Feb. 18—Lebanese officials say they are holding up to 6 people suspected of membership in the Japanese Red Army; among those detained is the sole surviving gunman in a 1972 attack at an Israeli airport that killed 24 people and wounded 100 others.

MEXICO

Feb. 19—General Jesús Gutiérrez, the former head of the National Institute to Combat Drugs, is confined to a maximum security prison outside Mexico City after he is charged with racketeering and aiding cocaine trafficking; Gutiérrez was forced to resign his post and detained on February 6.

PAKISTAN

Feb. 13—Final results reported in today's *Far Eastern Economic Review* give the Pakistan Muslim League 134 of 217 seats in the February 3 parliamentary election; party head Nawaz Sharif, who was prime minister from 1990 to 1993 but was dismissed for corruption and misrule, will again become prime minister; ousted Prime Minister Benazir Bhutto's Pakistan People's Party won only 18 seats.

Feb. 17—Sharif is sworn in as prime minister.

PALESTINIAN AUTHORITY

Feb. 1—Palestinian Authority officials say they are investigating the death of Yussef Ismail al-Baba, a Palestinian arrested on

January 3 who died in police custody in Nablus; a Palestinian human rights group claims Baba died after he was tortured.

Feb. 25—In the West Bank village of Hizmeh, 1 person is killed and 3 are wounded after being shot and beaten by 3 undercover Israeli soldiers; the Israeli army says the soldiers opened fire in response to an attack and that a full investigation is planned.

PERU

Feb. 1—President Alberto Fujimori and Japanese Prime Minister Ryutaro Hashimoto meet in Toronto to discuss a peaceful resolution of the hostage crisis in Lima, where Peruvian guerrillas are holding 72 people they seized at the Japanese ambassador's residence on December 17.

ROMANIA

Feb. 28—King Michael returns to Romania; the government restored his citizenship, revoked by the Communist government in 1948, a week ago.

RUSSIA

Feb. 1—President Boris Yeltsin meets with French President Jacques Chirac outside Moscow; today's meeting is Yeltsin's first with a Western leader since he was hospitalized for pneumonia January 8.

Feb. 10—Aleksandr Korzhakov, Yeltsin's former bodyguard, is declared the winner, with 26% of the vote, in yesterday's election for the parliamentary seat vacated by former national security adviser Aleksandr Lebed.

RWANDA

Feb. 2—A Canadian Roman Catholic priest is shot and killed while conducting mass in a settlement in northwestern Rwanda; the gunman's identity is unknown, but Hutu militants have stepped up a campaign of violence against foreigners in recent weeks.

Feb. 4—Four UN human rights monitors and their driver are killed in an ambush on a road southwest of Kigali; 4 days ago the monitors reported that Hutu death squads were killing Tutsi survivors and witnesses of the 1994 genocide.

Feb. 5—The UN says it is withdrawing all its personnel in western Rwanda to Kigali.

Feb. 9—Hutu militia kill at least 8 Tutsi at a fake military checkpoint on a highway about 23 miles northwest of Kigali.

Feb. 14—A Rwandan court sentences to death Froduald Karamira, a prominent former politician, for helping lead the interhamwe, a Hutu militia, in the 1994 genocide.

In a clash in Karengera, security forces kill 3 Hutu militants and arrest 1, all suspected in the February 4 slaying of 5 UN workers.

SERBIA

Feb. 4—in a letter to parliament, President Slobodan Milosevic announces that he will recognize the November municipal election results in the 14 cities won by the opposition coalition Zajedno; Milosevic's decision to annul the opposition victories sparked 77 days of protests in Belgrade and other cities; Zoran Djindjic, an opposition leader, will become mayor of Belgrade.

SOUTH AFRICA

Feb. 20—Defense Minister Joe Modise announces that South Africa will ban the use of antipersonnel land mines and will destroy its stock of 160,000 mines.

SPAIN

Feb. 10—Supreme Court Justice Rafael Martínez Emperador is shot and killed in Madrid.

A car bomb, exploding as a military van drives by, kills 1 civilian and injures 7 people in Granada; police blame the Basque separatist ETA guerrilla group.

Feb. 17—A car bomb kills a policeman in the northern city of Bilbao; the government blames the ETA.

Feb. 18—Six Basque political leaders are arrested in Bilbao on suspicion of involvement with the ETA.

SWITZERLAND

Feb. 5—The country's 3 largest banks announce that they will establish a \$70 million "humanitarian" fund for Holocaust victims and invite the government and national bank to contribute; Switzerland's commercial banks have been accused of hoarding deposits made in the 1930s by Jews who were later killed in Nazi death camps.

TAJIKISTAN

Feb. 17—A faction of Tajik rebels demanding safe passage for Rizvon Sadirov, a Tajik guerrilla commander, releases the last of its hostages, ending a 2-week crisis that began February 4 when the rebels took a group of 4 UN military observers, along with 7 journalists and Red Cross workers, hostage; in return for the hostages' release the Tajik government allowed safe passage for Sadirov and his guerrillas from Afghanistan to Tajikistan; in December the same faction took 23 hostages but released them.

Feb. 22—in Meshed, Iran, Tajik President Immomali Rakhmonov and opposition leader Sayid Abdullo Nuri sign a power-sharing agreement that gives each side 13 seats in the 26-seat National Commission for Reconciliation, allows Nuri to return to Dunshanbe from exile in Moscow, and gives Nuri the chairmanship of the commission.

TURKEY

Feb. 15—Thousands of people, mostly women, march in Ankara to protest what they consider the Islamic-led government's attempts to move the country closer to Islamic law.

UNITED KINGDOM

Hong Kong

Feb. 1—in Beijing, the China-appointed Preparatory Committee votes overwhelmingly to rewrite Hong Kong's Bill of Rights and reimpose past colonial laws restricting demonstrations and freedom of association.

Northern Ireland

Feb. 12—a British soldier is killed in a suspected Irish Republican Army attack at an army checkpoint in the village of Bessbrook.

UNITED STATES

Feb. 11—the government announces an end to a 30-year policy prohibiting US news organizations from opening bureaus in Cuba; the US says it will retain a ban on Cuban news bureaus in the US.

Feb. 13—in Washington, President Bill Clinton meets with Israeli Prime Minister Benjamin Netanyahu to promote talks with Syria.

Feb. 19—the State Department announces that the US will give \$10 million in food aid to North Korea, which the department says is suffering "widespread food shortages and malnutrition" in the wake of severe flooding over the past 2 years.

Feb. 20—The US refuses to recognize the World Trade Organization's jurisdiction in a trade dispute with the European Union over US legislation penalizing foreign companies doing business in Cuba involving American property seized by the Cuban government in the 1959 revolution.

Feb. 21—in Atlanta, a bomb explodes outside a nightclub frequented by a predominantly gay group of patrons, injuring 5; police detonate a 2d bomb discovered nearby; investigators say they have a letter claiming responsibility by the Army of God, a militant religious faction, for today's bombing and another Atlanta bombing last month at an abortion clinic.

Feb. 23—in New York City, 1 person is killed and 6 are injured when Ali Abu Kamal, a Palestinian, opens fire on the observation deck of the Empire State Building; Kamal, who later died of self-inflicted gunshot wounds, stated in a letter that he was distraught over financial matters and angered at support for Israel by the United States, Britain, and France.

Feb. 25—in Jacksonville, Florida, authorities charge Harry Shapiro, an Orthodox Jew, with planting a pipe bomb on February 13 at a synagogue where former Israeli Prime Minister Shimon Peres was to give a speech; the bomb did not detonate and was only discovered on February 22.

Feb. 28—Clinton certifies Mexico as a US ally in its antidrug efforts after securing promises that Mexico will extradite drug traffickers and increase prosecution of money launderers and organized crime; US antidrug certification status confers continued eligibility for US assistance prohibited to countries deemed uncooperative with US antidrug efforts; Colombia is decertified for a 2d consecutive year, but will not be subject to economic sanctions.

ZAIRE

Feb. 3—Military officials say the fighting between government troops and Tutsi-led rebels in eastern Zaire has spread to the southern province of Shaba.

Feb. 9—Rebel leader Laurent Kabila says his forces have captured 2 towns in the past 4 days.

Feb. 10—A national strike, called by the opposition to demand Prime Minister Leon Kengo wa Dondo's resignation, shuts down every major city.

Feb. 12—*The New York Times* reports that within the past several days Tutsi-led rebels massacred an unknown number of young Hutu men from among the 40,000 Rwandan refugees encamped in the eastern town of Shabunda.

Feb. 14—UN Secretary General Kofi Annan appeals for an end to airlifts of arms to former Rwandan soldiers and Hutu militiamen at the Tingi Tingi refugee camp in eastern Zaire; diplomats and aid workers say the Zairian government is supplying the arms.

Feb. 19—*The New York Times* reports that relief officials say between 30 and 50 people have been dying of hunger or disease each day at the Tingi Tingi refugee camp; food shipments have been slowed by Zairian army interference and by disagreements within the international community.

Feb. 22—Kabila's rebel forces capture Kalima, a town northeast of Kindu; some 30,000 mostly Rwandan refugees flee their nearby camp.

Feb. 24—Nine senior army officers say they will join the eastern rebellion against President Mobutu Sese Seko.

Feb. 25—Kabila arrives in South Africa for peace talks with the Zairian government; envoys from both sides met in Cape Town 5 days ago but made no progress.

Feb. 28—Relief workers report that rebels have captured Kindu, a town of strategic importance because of its airport and rail links.

UN Secretary General Annan calls for an international force to assist refugees in eastern Zaire. ■

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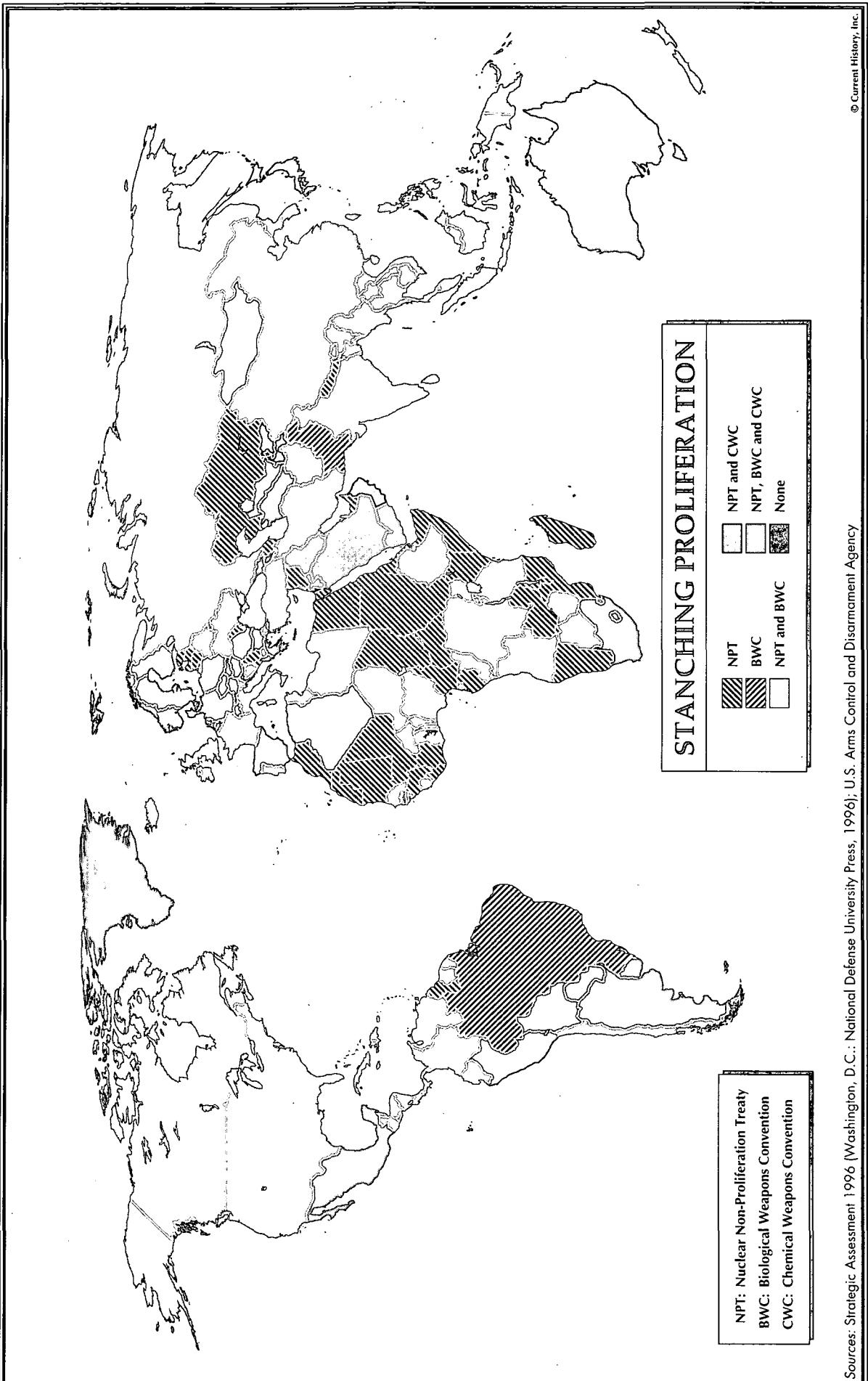
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